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THE RESULTS OF OPERATIVE TREATMENT OF VARICOSE VEINS OF THE LEG BY THE METHODS OF TRENDELENBURG AND SCHEDE.

By Robert T. Miller, Jr., M. D.,

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Many methods are employed in the treatment of varicose veins of the legs, no one of them being generally accepted or satisfactory. The aim of almost all operative procedures is to block the saphenous vein in order to do away with abnormal circulatory conditions existing in the leg as a result of valvular incompetency of the superficial venous system. The particular method employed is perhaps one of arbitrary choice since it is unusual to find any procedure recommended because its results, ultimate as well as immediate, are known to be good.

Schede, in 1877, published the method which goes by his name, consisting of a more or less extensive division between ligatures of the superficial veins a short distance above an ulcer. In 1884 Madelung published the method with which his name has become associated; this consists of excision of the varicose saphenous vein and its branches, the extent of operation varying with cases. This procedure had been employed by others before Madelung's paper appeared. In 1891 Trendelenburg published a paper in which was embodied the first accurate statement of the hydrostatics of the condition together with a description of his operation consisting of division between ligatures of the long saphenous vein. The point of division elected by him was in the lower third of the thigh but the tendency has been to divide at a higher and higher point until today the attempt is made to block the venous stream just at the saphenous opening in the deep fascia of the thigh. In general, the present operative therapy consists of the employment of some one of these classical methods or a combination of them; the choice of method, however, is often blind, being influenced by little else than the immediate future simply because late results are unknown.

Attempt is made to present in this paper the results of treatment of varicose veins of the leg as practiced in the Surgical Clinic of the Johns Hopkins Hospital. Inasmuch as it has been possible to follow some of the cases for 10 years or more, we are perhaps able to place a comparative value upon the various operative methods.

Analysis of Cases.

There have been 128 cases of varicose veins of the leg and associated disorders treated in this clinic up to July 1, 1905.

Race.—107 or 84% are white and 21 or 16% colored, a fact which is of no relative significance.

Sex.—73 cases are male, 57%; 56 or 43% female.

Age of Onset.—

Years.	*Number of cases.*
At birth	1
10-19	10
20-29	41=32%
30-39	29
	81 cases=69%
40-49	19
50-59	13
60-69	5
	37 cases=31%
Unrecorded	10

It was usually possible to learn when the patient first noted enlargement of the veins. Inasmuch as noticeable enlargement is probably preceded for an uncertain time by actual disease, the date of onset fixed by the patient is probably late rather than early. However, dating its onset at the appearance of visible enlargement it is seen that the disease becomes evident in one-third of the cases between the 20th and 30th year. Over two-thirds of all cases appear before the 40th year. This is rather striking; the usual and natural view that venous varicosity is a senile change appears erroneous.

Etiology.—In general, there are two great groups which can be sharply defined, viz.: inflammatory and non-inflammatory.

1. Inflammatory. This is by far the smaller group; in 128 cases there are but 40 with a definite history of phlebitis.

a. Pregnancy: There are 25 cases showing initial symptoms during pregnancy; of these 7 have a history of thrombosis.

b. Typhoid fever: 9 cases have a history of phlebitis in connection with typhoid, in 3 of which there was thrombosis of uncertain extent and location. Six of these cases occurred during convalescence.

c. Erysipelas: 2 cases have a history of preceding erysipelas.

d. Pneumonia: 1 case occurred during convalescence. The patient was a male aged 20; phlebitis occurred in the right leg.

e. Acute enteritis: There are 2 cases; one suffered a left phlebitis during an attack of "bloody flux," and one had a double phlebitis during severe dysentery.

f. Post-operative: 1 case had a double phlebitis 40 days after operation for strangulated hernia, the wound healing per primam.

The long saphenous vein was probably involved in all these cases of phlebitis. It seems reasonable that inflammation of the vein might, through resultant fibrosis of the valves, lead to valvular incompetency; this etiological relation seems fairly definite.

2. Non-inflammatory. In 128 cases, 88 are grouped here. Various causes are mentioned; constipation and excessive walking about or standing while at work are, as usual, the most frequent. Pelvic tumor is noted once. There is no case in which a heart lesion or cirrhosis of the liver was thought to have any bearing on the condition although routine physical examination was made in every case. The etiology of this group of cases is obscure since it is by no means certain that the mechanical conditions usually mentioned in this connection hold anything more than an incidental relation to the disease.

Location.—The right leg was noted as alone involved in 21 instances, the left alone in 25 instances and 74 cases had bilateral clinical signs among which those with most marked signs in the left leg were slightly in the majority. The lower leg was noted as alone showing clinical signs in 94 cases; the lower leg and thigh were involved together in 25 cases and the thigh alone in 1 case. These figures are probably not entirely reliable since the vein in the thigh has not been noted except when it was the site of visible or palpable enlargement or actual varix formation; manifestly many diseased veins have thus escaped detection. The presence or absence of Trendelenburg's sign has not been noted as a routine.

Operative Methods.

In this clinic the three classical methods have been followed almost exclusively; occasionally the Schede and Trendelenburg operations have been combined but usually only one method has been applied in any given case. The operations are carried out in the following manner:

1. *Trendelenburg.*—The long saphenous vein is approached through a short incision at right angles to its course and divided between ligatures near the saphenous opening. The point of division is probably within 10 cm. of the saphenous opening in every case and usually considerably nearer. Each end of the divided vein is doubly ligated with silk; occasionally a small portion of the vein, never more than 2 or 3 cm., is resected. The operation is usually done with local anæsthesia. Ninety-eight legs have been treated in this manner, the operation being bilateral in 30 cases. In addition to the high section of the vein in 16 cases a varicose mass below the ligation was excised; a partial Schede operation was done in one case; in one case extensive excision of varicose veins in the leg and thigh was practiced, and in 13 instances excision of an ulcer and skin graft.

2. *Schede.*—A partial or complete circumcision is done in the upper third of the leg dividing between ligatures all the superficial veins encountered; if the circumcision is partial it, at least, divides the veins of the anterior, internal and posterior aspects. There have been 19 legs so treated, the operation being bilateral in only one instance, while combined with 3 of these cases there was excision of an ulcer and skin graft and with 3 others scarification of an ulcer.

3. *Madelung.*—In 5 cases a more or less complete excision of the varicose saphenous vein was made.

RESULTS OF TRENDELENBURG'S OPERATION.

In 11 instances a personal examination was possible, and 30 results were reported by letter. The majority of these cases were rather severe, extensive varicose veins of the internal saphenous system being present at or below the knee; well marked varicose clumps were present in 10 thighs and ulcer was present in 22 of the 41 legs. Nine of these cases had, in addition, excision of a varicose clump below the ligation and in 8 cases an ulcer was excised and skin grafting was done.

Of these 41 cases, 32 legs or 78% have been cured or greatly improved. Approximately this result has been obtained rather generally; Goerlich, in a recent report from von Bruns' Clinic, found 84% cured or improved subjectively in a series of 69 observed results, while after an exhaustive review of the literature since 1892 he found that the cures varied from 85% to 56%, averaging about 75%.

The post-operative interval in this series varies from 6 months to 10 years, 4 months. If the cases are grouped by the following method,

Years since operation.	Cases.	Cure.	Percentage.
1-4	19	17	89%
5-8	19	12	63%
9-11	3	3	100%

there is seen a higher percentage of cures in the first four years than is found in the general average of the series, while the percentage of cures for the second quandrennium is considerably below the general average. Between the fourth and eighth year the percentage of cures drops from 89% to 63%.

The same tendency to recurrence of symptoms is shown, though in not quite so striking a form, by the following groupings:

Years since operation.	Cases	Cure.	Percentage.
1-4	19	17	89%
5-11	22	15	68%
1-3	12	10	83%
4-6	14	10	71%
7-9	12	9	75%
10-11	3	3	100%
1-5	22	18	82%
6-11	19	14	74%

Of the 9 instances of failure, there was recurrent ulceration in 7, and in 2 swelling and pain were very severe; obliteration of the saphenous vein in these cases afforded only temporary relief and the tendency to recurrence of symptoms was more marked as the post-operative time lengthened. Among the 17 cases examined it was possible to demonstrate in 8 a return of intact venous stream in the saphenous bed after division of that vein.

Return of venous circulation after division of the vein may take place in three ways, adopting the classification of Goerlich, viz.:

1. Anastomosis around the scar.
2. Formation of varices in the scar.
3. Union of the ligated stumps with formation of an intact vein.

Examples of all these types were found, of the first and second following Trendelenburg operations, and of the third following Schede operations. Anastomosis around the scar was found in one case. A man, aged 30 years, suffering with extreme varicosity of both legs and thighs was submitted to a bilateral Trendelenburg operation which relieved his pain entirely. For 6 weeks the veins of the lower legs were much smaller and then there was progressive increase in venous dilatation. Examination of the right leg 6 months after operation showed, internally to the scar, an anastomosing system of small superficial veins which could be distinctly traced from the dilated proximal saphenous stump into the distal stump of the divided saphenous vein. There was a somewhat similar finding on the left leg where the distal saphenous stump gave rise to a superficial set of small anastomosing veins which was situated internally to the scar and ran upward to become lost slightly above the level of Poupart's ligament; although this superficial anastomosing set could not be traced definitely to the proximal saphenous stump yet there can scarcely be a doubt that such was its ultimate destination. Trendelenburg's sign was not present in either leg, however, the saphenous vein filling visibly from the periphery in about 3 minutes; evidently the anastomosing system was still possessed of competent valves.

There are three instances of formation of varices in the scar. The first instance is in a woman, 57 years of age, upon whom a bilateral Trendelenburg operation was practiced 6 years ago. She suffered recurrence of ulceration, pain and swelling in both legs and experienced from the operation no relief whatever. Upon examination there was found to be extreme venous dilatation and varicosity in both feet and lower legs, while small ulcers were present near each ankle; the vein in the thigh was visible and palpable and in each scar there was a clump of varices whose individual vessels were 1-2 cm. in diameter. With pressure over the proximal stump Trendelenburg's sign was suggested but was not prompt.

The other case is a man, 37 years old, who was submitted to a Trendelenburg operation and division between ligatures of the external saphenous vein in the popliteal region 3 years and 3 months previously. The result was perfect subjectively, but there developed in the lower scar a varicose bunch of veins and below this point dilated, tortuous veins were moderately prominent.

It is of interest to note in this connection that in 69 cases examined from 1 to 12 years after Trendelenburg operations, Goerlich found 21 instances of anastomosis around the scar and 24 examples of varix formation in the scar. Recurrence of intact venous column does not necessarily mean recurrence of symptoms; this is a curious fact whose explanation is difficult. Goerlich distinguishes sharply between subjective and objective results; while he found 84% cured or greatly improved subjectively, he also found in the same series but 27% cured objectively and there were in the series of 69 cases 47 instances of functional restoration of the saphenous vein.

Results of Schede's Operation.

There have been 19 legs treated in this manner; of these we have the results in 9, 6 by examination and 3 by letter. Complete circumcision has been made in 4 cases and partial circumcision in 5, an ulcer being excised and a graft applied in one of the latter group. The conditions were well marked in these cases, œdema and decided varicose veins being present in the lower legs in all. Ulceration was present in 6 legs, scars in one other, and no note was made in 2 cases. From a clinical standpoint, the cases eventually submitted to Schede operations have not differed essentially from those submitted to Trendelenburg operations; the decision between these two operations has been a matter of personal choice by the operator and usually an arbitrary one, inasmuch as no knowledge of late results could be brought to bear upon the subject.

There are but 33% cured or greatly improved in the series of 9 Schede cases when grouped as a whole. The results arranged according to the post-operative interval, which varies between 1 and 10 years, follow:

Years since operation.	Cases.	Cure.	Percentage.
1	1	1	100%
2	1	1	100%
3	1	0	0
4	1	0	0
9	2	0	0
10	3	1	33%

The series, though a small one, is suggestive. The 2 cases of two years' standing or less are cured, while the older ones are almost uniformly failures. In each of the six unsuccessful cases, ulceration has recurred since operation. As in the series of Trendelenburg operations, there is again seen the tendency to recurrence of symptoms which becomes more pronounced as the post-operative interval lengthens, while the evidence of regeneration of an intact saphenous vein is much more striking in this series than in the previous one.

There returned for examination 6 cases, of which 4 were operative failures. In 3 of these cases were found one or more dilated veins running directly through the scar to unite the veins divided and ligated at operation; there was functional, if not actual anatomical, regeneration of the saphenous vein. In two of these three cases, Trendelenburg's sign was positive showing beyond a doubt that the hydrostatic conditions existing before operation had become fully re-established. The curious phenomenon of subjective cure and objective failure coexisting was well illustrated by the following case, in which 10 years previously a partial Schede operation had completely and permanently relieved the pain consequent upon a moderate varicosity of the veins of the right lower thigh and leg. This was a complete subjective cure; however, upon examination, there was found an intact saphenous vein running directly through the scar and below the knee many large tortuous veins. Trendelenburg's sign was positive in this case. These three cases may be grouped as examples of the third type of reestablishment of the venous stream, viz.: union of the ligated stumps with the formation of an intact vein. The possibility of dilatation of an anastomosis is excluded by the fact that in each instance regeneration took place at about the mid point of a circumferential incision.

In one of these cases the regenerated vein was obtained at a second operation; inasmuch as it is a case of unusual interest the history is given in some detail.

Surgical Number, 5062. J. J., colored, male, aged 41. Admitted Jan. 3, 1896, complaining of ulcers on his leg. The patient had suffered for 15 years with enlarged veins and chronic ulceration of his right lower leg. Upon examination there was found a varicose long saphenous vein in the thigh and general varicosity of the veins between the knee and the junction of the middle and lower thirds of the leg where there was a small superficial ulcer. Œdema and induration of the skin were slight.

Operation, Feb. 4, 1896.—Under ether anæsthesia a partial Schede operation was done in the upper third of the leg, leaving intact only a small bridge of skin on the outer side of the leg. Many small veins were divided between ligatures of fine black silk. Convalescence was without event; the ulcers healed and the patient was discharged on the 27th day.

In November, 1905, at the end of 9 years and 10 months the patient returned with the following interesting story: the operation was followed by increased œdema of his foot and recurrent ulceration within a year. Six months ago he noticed "a big vein cross the scar"; almost immediately one of the ulcers increased about 4 times in size and became much more painful. Upon examination the internal saphenous vein was found functionally intact from ankle to thigh, passing directly through the Schede scar. The vein was considerably enlarged, being about the size of the index finger at the knee, and there were numerous dilated varicose veins upon the posterior and internal aspects of the calf. Upon the anterior surface of the lower third of the leg were four superficial ulcers, three about 2 cm. in diameter and one about 6 cm. in diameter. Trendelenburg's sign was positive. There was complete regeneration of the divided saphenous vein and the condition was virtually that presented 10 years previously upon his first admission; it was decided to do a modified Trendelenburg operation which procedure had afforded him complete relief from a more aggravated condition in his other leg.

Operation, November 20, 1905.—Under ether anæsthesia 12 cm. of the vein were excised just beneath the saphenous opening, 6 cm. opposite the internal condyle and the recurrence through the scar was taken. Convalescence was uneventful except for extensive thrombosis in the remaining sections of the vein, although healing was per primam; the patient was discharged in the 5th week with marked decrease in size of the veins of the lower leg and no ulcers. This case is of especial interest, inasmuch as it illustrates graphically the relationship between ulceration and excessive venous pressure at the base of a valvularly incompetent saphenous vein.

The accompanying illustration of the hardened specimen shows the condition found. At A is the saphenous vein whose walls are greatly thickened, but retain roughly their normal

architecture. Between the ends of the relatively normal vein and uniting their lumina is a venous sinus (E) which is crossed transversely at about its mid point by the Schede scar (B). A white cord marks the intact lumen within which it has been placed; a probe was passed along this course before the specimen was cut and met no resistance whatever. No trace of the black silk ligatures was found. Arising from the main vessels are the cords *C*, which on microscopic examination proved to be veins obliterated by irregularly arranged fibrous tissue. The wall of the sinus is very fibrous, adherent to the adjacent structures and less than one-half the thickness of the adjoining vein wall. The lumen of the sinus measures 3.5 cm. by 1.5 cm. in greatest dimensions, is smooth and glistening throughout and receives numerous minute tributary venules. The transition from actual vein wall to sinus wall is gradual. The wall of the sinus consists chiefly of connective tissue, though there is a considerable amount of smooth muscle present; there is no definite arrangement of the muscle cells to be recognized. The lumen is lined by a layer of endothelial cells. It is impossible to say whether there was anastomosis between the ligated stumps of the saphenous vein itself or between some of its branches; the site of ligation is not accurately marked, and it is possible that the cords *C* represent the obliterated saphenous stumps while the anastomosis was between branches. The important point, however, is the anastomosis between veins, which had been ligated and divided, restoring the function of the saphenous vein and its pathological consequence of ulceration.

The question of regeneration of a vein divided between ligatures is an old one; cases have been reported by Langenbeck in 1860, Velpeau in 1862, Perthes in 1895, Grzes in 1900, and more recently Ledderhose in 1904. Trendelenburg denied the possibility and regarded supposed regeneration as dilatation of the second stem of a double vein; this position was supported by the fact that in many animal experiments Minkiewitsch had not seen regeneration after division between ligatures. Minkiewitsch regarded supposed regeneration as dilatation of one of the many minute collaterals around the point of division; inasmuch as the anastomosing vessels to which he refers are so small as to escape detection during operation, it is difficult to deny this possibility in certain cases, nor is it unlikely that many recurrences are of this type. However, in the case reported above, the possibility of dilatation of pre-existing anastomoses is probably excluded by the fact that regeneration took place at the mid-point of an almost circumferential incision which divided everything external to the deep fascia. In the two cases reported by Ledderhose recurrence of symptoms occurred 7 and 9 years after division between ligatures in the thigh. In each instance there was found a thin sinuous sac uniting the vein stumps whose limits were not sharply defined; the sac wall consisted of connective tissue and did not show the architecture of a vein. No trace of the ligatures was found. Goerlich found two cases which clinically presented the appearance of regeneration after ligation and division in the thigh, but was unable to obtain the specimen for examination.

There are two additional objections to the Schede operation that have been observed in our cases. There usually develops after operation a more or less marked œdema of the leg below the incision. This is possibly caused by too extensive division of the veins but in many cases it cannot be avoided without running the chance of doing too little. The second objection lies in the fact that the incision necessarily divides many cutaneous nerves and patients often complain considerably of anæsthesia below the scar while a certain number suffer from hyperæsthesia or even pain in the scar itself.

MADELUNG'S OPERATION.

It is impossible to obtain reports from any of the five cases in which Madelung's operation was practised; they were among the early admissions to the hospital and all trace of them has been lost. This is unfortunate since excision of the saphenous vein is followed probably less frequently by recurrence of symptoms than either a Trendelenburg or Schede operation. Symptoms may recur, however, even after complete excision. Madelung described his method and reported eleven cases before the Deutsche Gesellschaft für Chirurgie in 1884; v. Langenbeck, in discussing the paper, described a case in which there was recurrence of a varicose clump above the knee and of numerous varicose veins in the lower leg 3 years after excision of the saphenous vein. Whether probable freedom from recurrence of symptoms is enough to offset the additional risk incurred by a much longer and bloodier operation is open to question. Attempts to simplify and shorten the operation have been made. In 1899 Casati of Ferrara described a method of tearing out the vein through multiple short incisions, and the same operation, together with a special instrument, has recently been described by C. H. Mayo. Both of these operators disregard the lateral branches and control hæmorrhage by elevation and pressure, resorting only occasionally to ligation. Complete removal of the varicose internal saphenous vein is, of course, the most radical therapy, but it is doubtful whether it will ever be practised as generally as Trendelenburg's operation.

COMPARISON OF TRENDELENBURG AND SCHEDE OPERATIONS.

The operative cases reported in this paper are of approximately the same clinical severity and the post-operative interval in each series extends over 10 years; we may, therefore, justly compare the results. Trendelenburg's operation resulted in 78% cured in 41 cases; Schede's operation resulted in 33% cured in 9 cases. Absolute conclusions concerning the relative therapeutic value of these two operations would perhaps be unsafe if based upon the results of no more than 50 cases; however, in the present series the Trendelenburg operation has given a percentage of cure more than twice as great as the Schede operation. There are several minor points of comparison which may be mentioned. Trendelenburg's operation does not necessitate division of any large cutaneous nerve trunks, while Schede's operation results in extensive anæsthesia and often in a hyperæsthetic or painful scar.

Schede's operation is often followed by persistent œdema of the leg. From a technical standpoint, though there is no difficulty in either procedure, ligation of a single vein in the thigh is somewhat easier than multiple ligations in the calf. Local anæsthesia is satisfactory in practically every instance for Trendelenburg's operation and, though it doubtless suffices in circumcision of the leg, the tendency is to resort to general anæsthesia, a procedure which limits the practice of any operation.

It has been shown that division between ligatures does not ensure permanent obliteration of the saphenous vein and that its function may be restored by varix formation in the scar, by dilatation of small anastomotic loops not injured at operation and, infrequently, by union of the ligated stumps. Resection of 8 cm. or more of the vein will probably maintain a hiatus between the stumps sufficient to prevent subsequent formation of varices bridging the defect as well as occurrence of union of the ligated stumps. Recovery of function through dilatation of uninjured anastomoses is best avoided by dividing the vein just at the saphenous opening before it has received any branches and by using a generous transverse incision in the skin and subcutaneous tissue, thereby ensuring ligation of adjacent anastomosing loops such as that described above. Although objective failure and subjective cure seem to coexist in certain cases, yet objective failure is often accompanied by return of subjective symptoms and, therefore, an attempt should be made to prevent recovery of function by the saphenous vein. For these reasons resection of 8 cm. or more of the vein just at the saphenous opening, made through a generous transverse skin incision is to be preferred to a simple division between ligatures. This procedure has been suggested before and is practised by many surgeons. After a careful comparative review of results, Goerlich found that it resulted in a greater percentage of cured cases than any other of the many modifications of Trendelenburg's operation.

Complications.

There are few complications of these three operations. The most interesting, and luckily a rare one, is embolism. Reports are infrequent not only because fatal cases are unlikely to find their way into print, but also because symptoms of embolism may be so slight as to escape notice. Of 125 operations for varicose veins at the Johns Hopkins Hospital in which either excision or division between ligatures was practiced the following is the only case of possible pulmonary embolism.

Surgical Number 12463. L. J., colored, female, aged 32. Admitted October 11, 1901, complaining of ulcer on the left leg. The patient had suffered for 5 years with enlarged veins of the legs and for 1 year with chronic ulceration of the left leg. Routine physical examination revealed a functional heart murmur in the pulmonic area but was otherwise negative. There was decided general varicosity in the distribution of both internal saphenous veins, phleboliths being palpable in the right leg. A superficial ulcer 3 x 5 cm. was present upon the left leg. Trendelenburg's sign was positive in both legs.

Operation, October 15, 1901.—Under ether anæsthesia the left long saphenous vein was divided between ligatures high in the thigh and a mass of varices extending from the knee to the ankle excised, thrombi being encountered at each point of section of the vein. The duration of anæsthesia was one hour and 15 minutes, the pulse varying between 110 and 140 to the minute.

Convalescence was uneventful till the 5th day (Oct. 19) when the patient was suddenly stricken with dyspnœa and tachycardia; she "seemed to be suffocating." Her pulse was weak and beating 140 to the minute, while respirations were labored and ranging 55 to the minute. Strychnia and morphia were administered and within a few minutes her extreme distress disappeared. The respiratory and pulse rate gradually dropped and she was "in good condition" by the 10th day, apparently having sustained no permanent injury. Healing was per primam except for the presence of a small hæmatoma in the lower womb; there was no infection. Unfortunately no examination of the chest was recorded at the time, and, therefore, a positive diagnosis is not possible; however, the clinical picture of abrupt transient dyspnœa five days after ligation of a large thrombosed vein is very suggestive and similar, in its essential points, to that of the most frequent form of post-operative pulmonary embolism seen in these cases.

Goerlich found two cases of embolism in a series of 147 Trendelenburg operations and collected four others. The first case was that of a woman, 47 years old, in whom 2 cm. of the saphenous vein were resected in the upper third of the right thigh. The wound healed per primam, no note of thrombosis being made, and upon the 5th day the patient, arising from bed to urinate, was suddenly stricken with dyspnœa, cyanosis and pain in the right side. Absolute flatness and bronchial breathing were present over the right lower lobe and her temperature was 38° centigrade. During the next few days the signs subsided and an uneventful recovery ensued.

The second case was that of a woman, 47 years of age, in whom division between ligatures in the left upper thigh was made, the wound healing per primam. On the 10th day the patient complained of pain in the left side accompanied by cough and bloody sputum. There was flatness and tubular breathing in the left back and a temperature of 39° centigrade. The physical signs subsided slowly, and the patient was discharged on the 25th day.

Franz reports the case of a woman, 35 years of age, in whom, following ligation in the mid-thigh and curettage of an ulcer, there was thrombosis from the ligation to the mid-calf, although healing was per primam. Pulmonary embolism followed, resulting in infarct and effusion; the physical signs slowly subsided and the patient was discharged in 1½ months.

In the case of Nauwerk double resection of the saphenous vein was made in a woman 64 years old, the wound healing per primam. Ten days after operation the patient suffered sudden dyspnœa, and death followed within half an hour. At

FIG. 1.

FIG. 2.

FIGS. 1 and 2.—Venous anastomosis around the scar; 6 months after a bilateral Trendelenburg operation.

FIG. 3.

FIG. 4.

FIGS. 3 and 4.—Varices in scar uniting stumps of divided saphenous vein; 6 years after a bilateral Trendelenburg operation.

FIG. 5.—Varices in scar uniting stumps of external saphenous vein which was divided between ligatures 3 years previously.

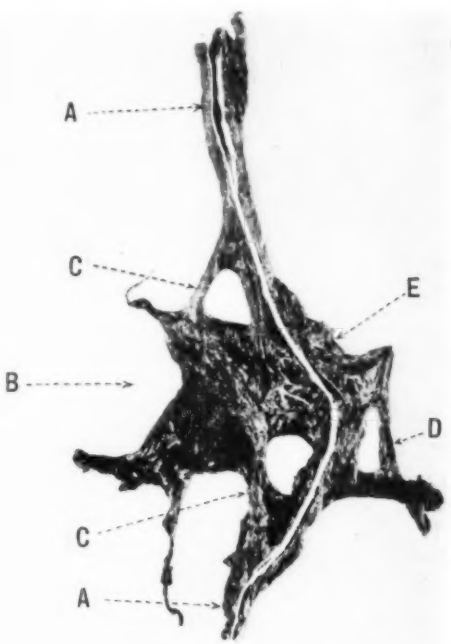

FIG. 6.—Regeneration of internal saphenous vein by anastomosis of ligated stumps; 10 years after a Schede operation. Alcohol specimen.

autopsy there was found occlusion of both pulmonary arteries by clots and a finger-sized thrombus in the proximal stump of the right saphenous vein. Thrombosis was attributed by the author to microscopic necrosis of the ligated stump.

Perthes reports sudden transient dyspnœa of but a few hours duration in a case which had slight fascia-necrosis in the wound and thrombosis near the point of ligation.

In Studsgaard's case embolism with transient symptoms followed per primam healing.

In addition to these cases there is one other reported by G. H. Sylvester. In the case of a man, aged 34, suffering with varicose veins in both legs, six clumps of dilated veins were excised, including three inches of the left saphenous vein in the thigh. Dressing was made on the twelfth day, finding per primam healing throughout; splints were worn up to this time and then discarded. "That night he suddenly sat up in bed, complained of feeling faint, fell back and died almost immediately." At autopsy there was found occlusion of the pulmonary artery at its bifurcation by a clot; no thrombi were found in the iliac veins, but the veins of the legs were unfortunately not examined.

There are thus on record eight cases of pulmonary embolism following operations upon varicose veins of the legs, viz.: Franz, Nauwerk, Perthes, Studsgaard, Goerlich 2, Sylvester and one case in this report. Four cases occurred after division between ligatures in the thigh, two cases after multiple partial excisions with ligation and division, and one case after bilateral complete excision of the saphenous veins. In three cases there was a slight wound complication, but in no instance was infection thought to be present. Embolism occurred after the simplest as well as the most extensive procedure.

Symptoms appeared on the 5th day twice, on the 10th day twice, and on the 12th day in one instance.

In four cases the symptoms were transient, subsiding within a few days; of these four, two cases followed division between ligatures and one followed division with resection of a varicose mass. In two cases there were definite physical signs of pulmonary infarct, the symptoms persisting for three and six weeks respectively; both followed division between ligatures and in one of them there was extensive post-operative thrombosis below the ligation. In two cases sudden death resulted; both of these followed extensive procedures, viz., bilateral resection and multiple excisions. There seem to be three fairly distinct types of post-operative pulmonary embolism which may be recognized; the mildest is transient and comparatively harmless, causing more or less marked respiratory distress for a few hours. The more severe results in definite infarct which may cause symptoms for four to six weeks and probably leaves a definite pulmonary lesion, while the most severe causes immediate death by occlusion of the pulmonary arteries. Although it is, perhaps, a suggestive fact that the two fatal cases of pulmonary embolism have followed extensive operative procedures, it is unsafe, as yet, to draw definite conclusions in regard to such a possible relationship.

CONCLUSIONS.

1. Varicose veins of the leg are not an incident of senility; the condition is rather a disease of young and middle-aged individuals, over one-third of the cases appearing before the 30th year and two-thirds before the 40th year.

2. From an etiological standpoint, there are two classes, viz., inflammatory and non-inflammatory. The inflammatory group includes about one-third of all cases, phlebitis occurring as a complication or sequel of pregnancy, post-operative convalescence or an acute infection, among which typhoid fever is the most frequent. The pathology of the non-inflammatory group is obscure.

3. In 128 cases the right and left legs are affected in about equal proportion; over one-half of the cases are bilateral.

4. Trendelenburg's operation cured 78% in a series of 41 cases; this is about the result generally reported. In the first four post-operative years 89% were cured, in the 5th-8th post-operative years but 63% were cured; the tendency to recurrence of symptoms increases as the post-operative interval lengthens.

5. Schede's operation cured 33% in a series of 9 cases. Of two cases, 2 years or less since operation, both were cured; of seven cases, more than 2 years since operation, but one was cured. The tendency to recurrence of symptoms as the post-operative interval lengthens is much greater after a Schede than after a Trendelenburg operation.

6. Division between ligatures of the saphenous vein does not ensure permanent occlusion. The venous stream may be reestablished in three ways, viz., dilatation of anastomoses around the point of division (two cases), formation of varices in the scar (three cases), or end-to-end anastomosis of the ligated stumps (three cases). The Schede operation is followed particularly by anastomosis of ligated stumps; of six cases examined three showed an intact saphenous vein running directly through the scar.

7. Functional restoration of the saphenous vein may be, but is not always, accompanied by recurrence of symptoms.

8. Resection of 8 cm. or more of the saphenous vein at the saphenous opening made through a generous transverse skin incision is to be preferred to simple division of the vein.

9. Post-operative pulmonary embolism is rare, but has occurred between the 4th and 13th days. The onset is marked by sudden dyspnœa, cyanosis, tachycardia and signs of collapse accompanied by rise in temperature; the symptoms may subside rapidly, may persist with the physical signs of pulmonary infarct, or may be followed immediately by sudden exitus.

I wish, here, to express my thanks to Professor Halsted for the opportunity of reporting this material from his clinic; and to Dr. Bloodgood for the privilege of the laboratory.

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BLOOD PRESSURE CHANGES IN CHEYNE-STOKES RESPIRATION.

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In ten clinical cases of Cheyne-Stokes respiration, the periodic alternation of dyspnœa and apnœa was associated with Traube-Herring waves of blood pressure. These cases may be separated into two groups. In the first, the period of respiratory activity was accompanied by a rise of blood pressure, the period of apnœa by a fall. In the second group, the inverse relations were present. In both groups there was a change in the pulse rate. The slower pulse was associated always with the fall in blood pressure. In the first group therefore it was present during the apnœa, in the second during the dyspnœa.

Historical Note.—Murri,[1] by the use of the plethysmograph, observed a decrease in the blood contents of the arm during the first part of dyspnoea. Hill,[2] by the same means, in a single case, the nature of which he does not state, observed a constriction of the vessels during dyspnœa and a dilatation during apnœa. Cushing,[3] by the employment of the Riva Rocci sphygmomanometer, found a rise of blood pressure with each group of respirations in two cases of cerebral hæmorrhage. Mosso,[4] by means of the sphygmomanometer devised by himself, found in the periodic respiration occurring in normal men at high altitudes, a rise of blood pressure associated with each group of respirations.

Methods.—The blood pressure was obtained by means of the Erlanger sphygmomanometer.[5] The recording pen of this instrument shows the largest pulsations when the pressure exerted upon the arm by the cuff is equal to diastolic blood pressure, and these pulsations decrease as the pressure is raised or lowered. The systolic and diastolic pressures were first obtained by the method of increasing the pressure until the pulse at the wrist disappears, and then allowing it to slowly fall. The pressure upon the arm was then adjusted so that it was permanently at a point midway between systolic and diastolic pressures, and a continuous tracing of the pulse was recorded. Any change in blood pressure produced an effect upon the size of the pulsations of the recording pen. A rise of blood pressure increased the size of the pulsations, because such a rise brought the diastolic pressure nearer to the point at which the instrument was set. A fall in blood pressure had the opposite effect by making more distant the diastolic pressure from this point. The respirations were registered upon the same record by means of a Marey double tambour.

Group I. Cheyne-Stokes respiration in which there is a rise of blood pressure and an increase in the pulse rate with each respiratory group.—Two of the series of ten cases belong in this group. The condition with which it was associated was in both cases increased intracranial tension. The first was a case of solitary tubercle of cerebrum with tuberculous meningitis. The patient was admitted to the hospital in Dec. 1905 (Surg. No. 18,531). The increase in the intracranial tension was indicated by the symptoms and confirmed at a subsequent exploratory craniotomy and decompression. This

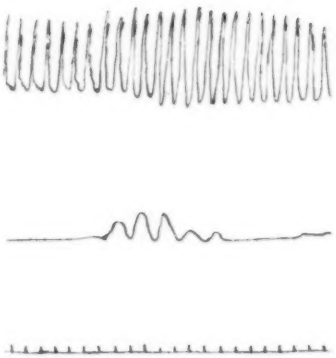
[1] "Sulla genesi del Fenomeno di Cheyne-Stokes," Rivista Clinica, Fasc 10, 2-11, 1883. Also "Scritta Medici di Augusto Murri, Bologna," 1902. Tome II.

[2] "Cerebral Circulation." London, 1896.

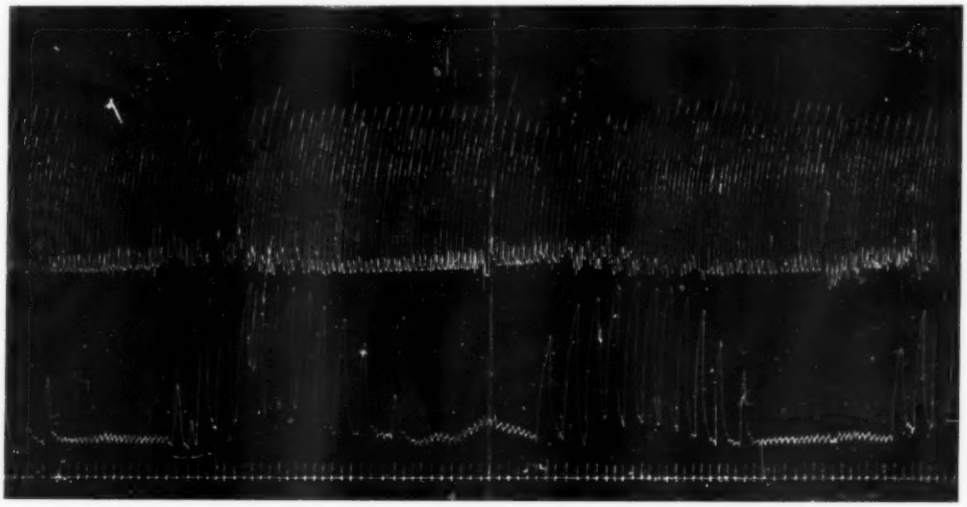
[3] American Journ. of the Med. Sci., September 1902, and June, 1903.

[4] Fisiologia dell'uomo Sulli Alpi. Also Archiv. ial. de Biol. T. XLIII. Fasc 1, 1905.

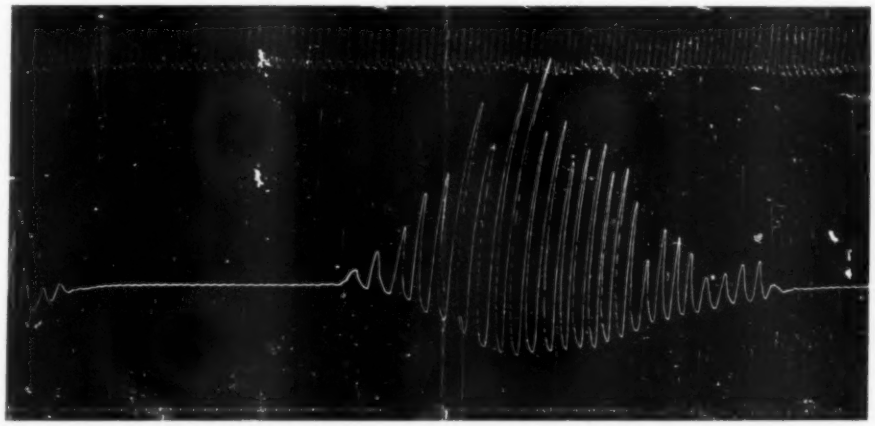
[5] Johns Hop. Hosp. Reports, 1904, XII.



TRACING No. 1.—From a clinical case of Cheyne-Stokes respiration in association with increased intracranial tension. The upper curve represents the pulse tracing obtained from the brachial artery by means of the Erlanger sphygmomanometer. The instrument was permanently set at a point midway between systolic and diastolic blood pressures. An increase in size of the pulse waves represents a rise in blood pressure, a decrease a fall in blood pressure. The middle curve represents the respirations recorded by means of a Marey double tambour, the upstroke representing inspiration. The lowermost line records the time in one second intervals. The record is to be read from left to right.



TRACING No. 2.—A similar record obtained from a case of Cheyne-Stokes respiration occurring clinically in association with cardiac insufficiency. The curves are to be interpreted as in Tracing No. 1.



TRACING No. 3.—Record of experiment in which a normal individual endeavored to simulate Cheyne-Stokes respiration. The tracing is to be interpreted as records 1 and 2.

ERRATUM.

These curves should have accompanied Dr. Eyster's "Blood Pressure Changes in Cheyne-Stokes Respiration," p. 296, September BULLETIN.

patient had well marked Cheyne-Stokes respiration for the first five days after admittance to the hospital. The respiratory groups varied greatly in character. Atypical groups, such as descending groups of a few respirations and groups of irregular respirations, were unusually frequent. The true Cheyne-Stokes type with an ascending and descending phase to each group was however common. Numerous tracings obtained during the course of observation of this patient showed well the blood pressure changes associated with the respiratory periods. The rise in blood pressure which was constantly associated with the periods of dyspnœa, in some cases preceded, in others was coincident with, and in others followed slightly the beginning of respiratory activity. There was marked slowing of the pulse during apnœa, and the tracings showed the greatest slowing to be present with the most marked fall of blood pressure. A gradual rise of blood pressure occurring during the first five days of observation, was associated with a decrease in the periodicity of the respirations; an increase in the length of the dyspnœic periods at the expense of the apnœas. On the fifth day, a complete disappearance of periodic respiration was accompanied by a rise of 12 mm. in systolic pressure occurring in the course of five hours. Following this there was no return of Cheyne-Stokes respiration. The blood pressure continued to rise until the operation, on the seventh day after admittance. One and one-half hours after the operation the systolic pressure had fallen 35 mm. Tracings taken after the disappearance of the Cheyne-Stokes respiration showed an entire absence of the blood pressure changes previously observed.

The second case occurred in the service of Dr. Arthur Hebb, and to him and to Dr. Cushing, who was called in consultation, I am indebted for the privilege of obtaining tracings from this patient. The case was one of cerebral hæmorrhage of two weeks duration. Cheyne-Stokes respiration had been present at intervals, interspersed with periods of normal respiration. The records showed a similar relation of blood pressure to the respiratory variations as in the previous case.

Tracing No. 1 is from the case first described. The upper line is the tracing of the sphygmomanometer pen, obtained by the method above described. The middle tracing is the respiratory curve. The lowermost line records the time in one second intervals.

Group II. Cheyne-Stokes respiration in which there is a fall of blood pressure and a slowing of the pulse rate with each group of respirations.—This group includes eight cases of Cheyne-Stokes respiration occurring in association with cardiac and arterial disease. The blood pressure changes in relation to the groups of respirations are shown in Tracing No. 2. Commencing usually at the first half of apnœa, there is a fall of blood pressure which continues to about the third or fourth respiration of the following group. The slowing of the pulse is associated with the most marked fall of blood pressure. It is usually to be observed several seconds before respirations begin and reaches its maximum during the first few respirations. A rise of blood pressure and a gradual increase of pulse rate occur from this point and reach a maximum in the first half of the following apnœa. This rise is at first slow; toward the end of dyspnœa and the first part of the following apnœa it is more rapid.

Discussion and Comparison of the Two Clinical Groups of Cheyne-Stokes Respiration.—Disappearance of the periodic respiration in both groups of cases is accompanied by a disappearance of the blood pressure waves. The intensity of the respiratory variations furthermore corresponds to the intensity of the blood pressure changes. In one of the cases of Group II, the gradual disappearance of the Cheyne-Stokes respiration over a period of three hours showed well the gradual decrease and finally the disappearance of the blood pressure changes. The same has been observed in several cases in records taken during sleeping and waking in the same patient. The Cheyne-Stokes respiration was frequently more marked in the former case and was accompanied by more marked blood pressure changes. The blood pressure changes cannot be regarded as a mechanical result of periodic respiratory activity, because in normal individuals the latter gives an entirely different series of blood pressure changes. Numerous records were obtained in which a normal man respired periodically and endeavored to simulate Cheyne-Stokes respiration, and the blood pressure changes that were associated differed entirely from those that occurred in either of the groups of true Cheyne-Stokes respiration. Tracing No. 3 is the record of such an experiment. Besides the difference in the blood pressure changes in the two groups described, and the different conditions under which they occur, certain other characteristics serve to distinguish them. The regular alternation of apnœa and dyspnœa was more constant in Group II and the respiratory groups were much more uniform and nearly always of the typical Cheyne-Stokes type, with an ascending and descending phase to each group. Groups of irregular respirations and especially groups of a gradually decreasing scale in which the first respiration is the largest, were common in the intracranial cases. The periods of apnœa in Group I were associated with deep unconsciousness. In Group II there was usually mental dullness and quiet at that time, but the impairment of consciousness was not nearly so marked and in several cases was not noticeable. The periods of respiratory activity in the second group were much more dyspnœic in character than those in Group I.

Experimental Cheyne-Stokes Respiration.—Cheyne-Stokes respiration was produced in dogs by means of cerebral compression. A full description of these experiments will appear shortly in the "Journal of Experimental Medicine." The method used for increasing the intracranial tension was that employed by Cushing.[6] An isotonic solution of sodium chloride was run into the closed cranial cavity through a

[6] Loc. cit.

trephine opening, into which was screwed an accurately fitting brass canula. The pressure of the entering fluid was measured by a mercury manometer. The blood pressure from the carotid or femoral was recorded by another mercury manometer, the pen of which wrote upon the same record and as nearly as possible in the same vertical line. The zero pressure of each system was represented by the same base line. Periodic respiration was obtained when the blood pressure rose and fell in the form of waves above and below the line of intracranial tension, the periods of respiratory activity accompanying the rise, the periods of apnœa the fall. When this relation between the intracranial and blood pressure was lost, periodic respiration disappeared. The periodic respiration thus produced varied in character. Groups of two to twenty respirations of equal size, groups of an ascending scale and groups of a descending scale, and finally groups which presented both an ascending and a descending phase (true Cheyne-Stokes type). The occurrence of the respiratory groups was associated with an increase in pulse rate. After section of both vagi, the pulse rate was the same in dyspnœa and apnœa.

A series of experiments upon brain anæmia consequent upon ligation of the cerebral arteries was performed. The results of these may be briefly summarized as follows: (a) The irritability of the respiratory centre is markedly susceptible to a considerable reduction in its blood supply, and if this reduction is sufficiently great the centre soon becomes incapable of response, even to the strongest stimulation. The irritability is rapidly regained upon the occurrence of a renewed blood supply if the preceding anæmia has not lasted too long. (b) The irritability of the other medullary centres is much less susceptible to a reduced blood supply. The vasomotor centre may respond to stimuli many seconds after the occurrence of absolute anæmia. (c) The effects of increased intracranial tension upon the medullary centres are due to the anæmia that results and not to any pressure effects directly.

Discussion of the Experiments in Relation to Group I.—In experimental Cheyne-Stokes respiration occurring in increased intracranial tension, the dyspnœic periods are accompanied by a rise of blood pressure above the line of intracranial tension, the periods of apnœa by a fall below this line. When the intracranial pressure is greater than the blood pressure, the brain and medullary centres must be in a condition of anæmia, for the pressure without the capillaries being greater than that within, these vessels must fall into a state of collapse. A rise of blood pressure above the line of intracranial pressure is associated with a renewed supply of blood to the centers and brain. The changes in blood supply may be observed directly by observation of the cortex through a glass window screwed into a trephine opening in the skull. The periods of respiratory activity were therefore associated with the periods of blood supply to the medullary centres, the periods of apnœa with anæmia. Anæmia increases the stimulus to the respiratory centre by diminishing the rate of diffusion of the CO_2 from the cells of the centre and at the same time decreasing their oxygen supply. In a condition in which blood pressure waves vary through a considerable degree, and hence cause periodic variations of the blood supply to the respiratory centre, we should expect the response of this centre to be greatest when the stimulus is greatest, *i. e.*, during the fall of the blood pressure wave. Apnœa, if such were present, we should expect to occur when the rise of the blood pressure wave sufficiently decreased the stimulus. In periodic respiration occurring in increased intracranial tension, the opposite condition prevails. This is most probably due to periodic variations in the irritability of the respiratory centre as a result of the marked periodic variations in its blood supply. During the apnœa, the blood supply is so reduced that the irritability of the centre suffers greatly, and it is not capable of responding until the irritability is regained as a result of a renewed blood supply, or the stimulus, as a result of the long apnœa, is greatly increased.

Summary and Conclusions.—In ten cases of Cheyne-Stokes respiration occurring in man, the periodic alternation of dyspnœa and apnœa was accompanied by long Traube-Hering waves of blood pressure. These cases may be separated into two groups as regards the relation between the respiratory periods and the blood pressure wave. In Group I, each dyspnœic period was associated with a rise of blood pressure; in Group II, the opposite relations existed. In the former, the pulse rate was slowed during the apnœa, in the latter during the dyspnœa.[1]

Periodic respiration may be produced in animals by an increase of intracranial tension, and blood pressure changes are observed which bear the same relations to the respiratory periods as occur in clinical cases of periodic respiration associated with increased intracranial tension. In the former case, the waves of blood pressure rise and fall above and below the line of intracranial tension, and the underlying cause of the periodic respiration is a periodic alternation of anæmia and blood supply to the brain and medullary centres.

From the clinical standpoint, in the opinion of the author, the following conception is important. Cheyne-Stokes respiration occurring clinically in cases of increased intracranial tension, in all probability represents similar conditions to that observed in the animal experiments, namely blood pressure waves rising and falling *above and below the line of intracranial tension*. According to this conception, the appearance of this condition in a patient indicates one of two things, either a still further increase in the intracranial tension, or

[1] Mosso, in a recent publication, separates what is apparently a third group of Cheyne-Stokes respiration. In the periodic respiration occurring in normal men at high altitudes, he has observed a rise of blood pressure and a decrease in the pulse rate with each group of respirations (Fisiologia dell'uomo sulli Alpi. Fig. 31 and 32, and Archiv. ial. de Biol. T. XLIII, Fasc 1, 1905. Fig. 21). This differs from both of the groups described by me.

a beginning loss of the blood pressure reaction to the increased intracranial tension.[1] In either case the prognosis is bad. A disappearance of Cheyne-Stokes respiration in a case of increased intracranial tension means on the other hand either a decrease in the tension or a rise of blood pressure, and hence is of good prognosis. Cheyne-Stokes respiration that is accompanied by a rise of blood pressure and increase of pulse rate during the dyspnœic periods is probably always associated with increased intracranial tension.

The cause of the second group of cases is not as yet clear. The author is engaged upon a special research in this subject, and a subsequent report will be made.

[1] Cushing has shown in a most striking way, both experimentally and clinically, the rise of blood pressure that follows an increase of intracranial tension. (Physiol. u. anat. Beobacht. u. d. Einfluss v. Hirnkompression u. s. w. Mitteil. a. den grenzgebieten d. Medizin u. Chirurgie, Bd. 9, Hft. IV & V, 1902.) Amer. Jour. Med. Sciences, September, 1902, and June, 1903. Johns Hop. Hosp. Bulletin, Vol. XII, No. 126, September, 1901. He states as a general law that "an increase in intracranial tension occasions a rise of blood pressure which tends to find a level slightly above that of the pressure exerted against the medulla." The results of my experiments have confirmed his conclusions in all essential details.

OBSERVATIONS ON A CASE OF PALPITATION OF THE HEART.

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The sensation of palpitation of the heart is so distressing, and its causation so obscure, that the following observations may not be without interest. It is not uncommon for persons, especially for neurasthenics, to be conscious of each individual heart beat and to be greatly distressed by it, partly from fear of "heart disease" and partly from the nature of the sensation itself—although the exact character of the sensation seems to vary in both its nature and the region to which it is referred. In some, the sensation is referred to the region of the apex and is slightly painful in character. In the present case each systole was accompanied by a feeling of pressure or almost of traction referred to a point within the thorax about the level of the Angle of Ludwig. No symptoms were felt during diastole. The patient being a physician, was thoroughly conscious of its trivial nature, and not at all disturbed mentally by the occurrence, being interested in the symptom only from the scientific standpoint.

The main interest in the case lay in determining whether or not the symptom of palpitation was associated with any irregularity or disturbance in rhythm or force of contraction, in irritability, or in conductivity in the heart, or whether it was in any way associated with characteristic changes in pulse rate or blood pressure. For this purpose blood pressure records of maximum and minimum pressure were taken with the Erlanger apparatus. Tracings of the brachial pulse and other pulsations were taken with the author's modification of this apparatus.

Patient L. N. is a physician, 26 years old, married, of more or less nervous temperament. Has had measles, chicken-pox, whooping cough, but no other diseases except an annual tonsillitis. Has had no other phases of rheumatic cycle. No venereal diseases. Does not smoke. Takes very little wine and beer, no whiskey; drinks coffee in moderation. No drug habits.

Heart has always been normal: blood pressure, which has been taken at intervals during the past three years, has been maximum 110 to 120 mm.; minimum, 80 to 90 mm. Pulse rate when patient is quiet 64 per min. Palpitation was first felt during extreme excitement in April, 1905, being then accompanied by slight but definite irregularity of pulse rate lasting but 5 to 10 minutes; palpitation ceased with the subsidence of the irregularity, and the latter has never returned. Since then palpitation has occasionally been felt after excitement, but never enough to keep patient awake. It is associated with a slight smothering sensation, and sense of fulness and traction referred to about the bifurcation of the trachea—never precordial; the sensation being always of distress rather respiratory than cardiac, although it is always exactly synchronous with cardiac systole and can be used to count the pulse rate.

On Feburary 23, after mental excitement such an attack of palpitation set in, lasted throughout day and night and was present next day, when observations were made with a view to determine the presence or absence of irregularities of contractility (as found by Mackenzie[1] in some cases, with precordial pain or palpitation), or of any other cardiac complications.

Note on Physical Examination Made by Dr. Cole, February 24.—With patient standing, point of maximal impulse is not well seen nor felt. In recumbent posture, P. M. I. also not well seen and felt. No visible impulse at the base. Fairly well marked throbbing in the neck and epigastrium. Very slight diffuse heave over the precordium.

The area of deep cardiac dulness extends 9.5 cm. to left at the 5th rib, 7.5 cm. in 3d interspace parasternal line; above to upper margin of 3d rib. To right 3 cm. in 3 i.s., 5 cm. in 4 i.s. On auscultation, heart sounds are best heard in 5th i.s.

[1] James Mackenzie, An Inquiry Into the Cause of Angina Pectoris, British Medical Journal, Vol. 2, 1905, p. 845; New Methods of Studying Heart Affections, ibid. Vol. 1, 1905, p. 815.

9 cm. from mid-sternal line. Sounds are a little distant, slightly muffled though well heard. Both sounds quite clear at apex, second sound a little snapping, both of almost equal intensity. Second sound becomes more ringing as one approaches base and over sternal articulation of 3d rib second sound is snapping, more so than to right of sternum. Heart sounds are quite clear.

First sound is faint and just audible. No murmurs can be heard anywhere. Heart action is quite regular.

Pulse is quite regular with patient lying 15 to ¼ m. There is a definite dicrotic wave felt and a well marked capillary pulse is visible. Patient on standing suddenly pulse rate jumps to 22 to ¼ m.

The palpitation gradually disappeared after four days—and with it the throbbing of the vessels, and the visible capillary pulse—but there were no changes in objective findings otherwise.

The blood pressure maximum 110, minimum 80-85 (Fig. 1-*I*), and pulse rate 64 to 76 (reclining position) are normal for the individual upon whom these observations had frequently been made when he was in normal condition. Tracings taken from cuff on arm at different pressures (Fig. 2) show normal and uniform form of beats—showing no abnormality in contractility. The same may be said of the changes in blood pressure and pulse rate observed after five minutes chest-weight exercises (Fig. 1-IIa), and upon suddenly rising from the reclining to the standing position.

The same relation of pulse rate and blood pressure to respiration (inspiration 72.7 per min.; expiration 69.0 per min., with rise of blood pressure in inspiration and fall during expiration), is also quite normal and not exaggerated. In other words, during the period when palpitation was noted, the heart was responding to stimuli in the same degree as when no palpitation was felt.

Comparison of the tracings obtained from the carotid artery, jugular vein, and apex show that each ventricular systole (Fig. 6, *s-d*) is preceded by a normal auricular systole (Fig. 5, *a-c*) the period of conduction (*a-c*=0.16 sec.) being normal. The time (*s-c*=0.04 sec.) from the beginning of systole to the beginning of the carotid wave is also normal, as is the period of systolic output from the heart (Fig. 4, *c-d*=0.26 sec.). There is no sign of irregular or aborted systoles nor of abnormal auricular contractions. The only objective abnormality observed was that there was marked throbbing in the vessels of the neck, marked capillary and dicrotic pulse.

None of these factors, however, throw any light upon the causation of the symptom of palpitation, as each and all may be present to a much more marked degree without bringing it about. Moreover, the palpitation was not felt for a few minutes after the chest-weight exercises when the heart was being subjected to the greatest strain; but on the other hand, it was always the most intense when patient had been lying down for a few minutes. It may be stated that the patient's attention was directed toward the palpitation quite as much after exercise as at other times, so that the psychical factor, as the sole cause, may here be excluded.

Several other possibilities may also be considered.

1. The maintenance of the normal blood pressure (maximal and minimal) with normal pulse rate in spite of the presence of a marked capillary pulsation and throbbing carotids showing an abnormal peripheral vasodilation would indicate an increased total blood flow (although the product of pulse pressure by pulse rate is normal), which, according to the work of Erlanger,[2] would be possible only if there were an increased amount of blood put out at each systole. However, even if this is present in the case under discussion, increased systolic output has no relation to palpitation in other cases with pulse irregularities, in which the weaker beat can be noticed by the patient quite as well as the stronger ones. On the other hand, in many tachycardias with imperfect systolic emptying of the heart the patient is nevertheless not conscious of the individual beats. Palpitation is therefore quite independent of the degree of contractile power, or effort.

In the case under consideration it was more marked with slower rhythm than with rapid rhythm, and had no relation to the work done by the heart.

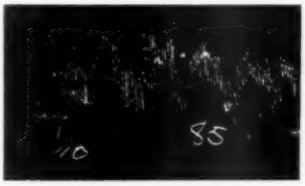
2. The nature of the sensation described above and its reference by the patient suggested the possibility of traction from adhesions, etc. But the absence of pulsus paradoxus, tracheal tug, Broadbent's sign, and of signs of enlarged bronchial glands, rather excludes this interpretation. In order to determine the presence, if any, of abnormality in the intratracheal pressure, tracings were made of the pressure in the air passages, with glottis closed (Fig. 8), and with glottis open (Fig. 9). These, however, are normal,[3] showing the carotid wave when glottis is closed, and the negative wave in systole when glottis is open—no abnormal waves.

3. Considered from the standpoint of a purely functional neurosis, it may be stated that there were no signs of abnormality in the reflex action of vagus or accelerator, nor of increased cardiac response, nor were there at any time any psychic disturbance such as Henry Head (Brain, Part 95, page 345, 1901) has found to be frequently associated with "visceral pain" from the heart.

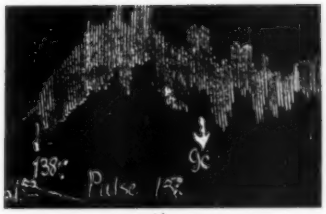
4. Since the above observations were made, the patient has several times experienced marked throbbing of the vessels of forearms and hands—of which he was made conscious by the shock felt in these parts throughout the whole systolic period—corresponding closely to the duration and occurrence of the palpitation felt in the chest on February 23 and 24. Blood pressure determinations could never be made during the short periods (fifteen to twenty minutes) when this symptom prevailed; but at these times there was marked reddening of

[2] Erlanger, J., Johns Hopkins Hospital Reports, Vol. 12, p. 53, 1904.

[3] Cf. Mosso, Sul Pulso negativo.—Arch. per. Ie. Sc. Med., Torino, Vol. III, 1878, cit. from E. J. Marey, La Circulation du Sang, Paris, 1882, p. 434.



I.



II.

Fig. 1—I. 1:40 p. m. Blood pressure maximum 110 mm. hg., minimum 85 mm. Pulse rate, 72 per min. II. 1.52 p. m. After exercise. Maximum 138 mm., minimum 90 mm. Pulse rate 132 per min.

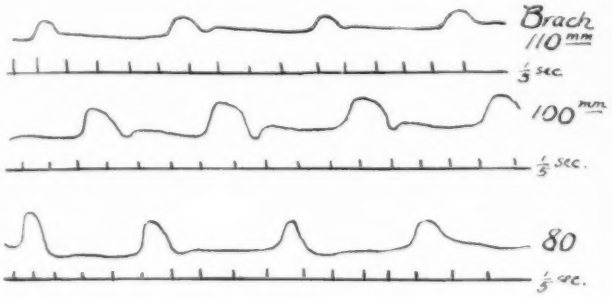


Fig. 2.—Pulse tracings from cuff on upper arm at 110, 100, 80 mm. hg., respectively, showing regularity in force and rhythm.

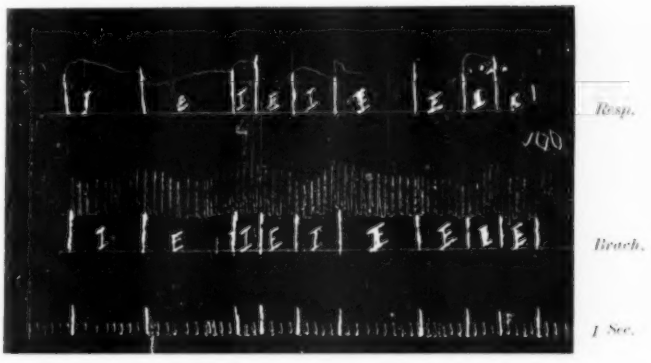


Fig. 3.—Tracing of respiration and brachial pulse. Average pulse rate: inspiration, 72.7 per min.; expiration, 69.0 per min.

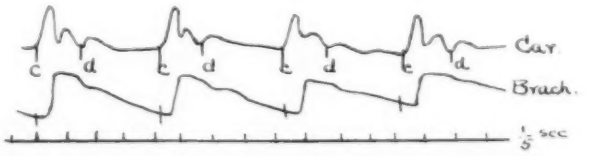


Fig. 4.—Pulse tracing from carotid and brachial arteries simultaneously.

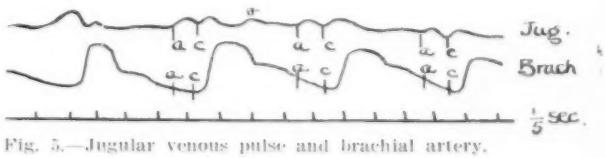


Fig. 5.—Jugular venous pulse and brachial artery.

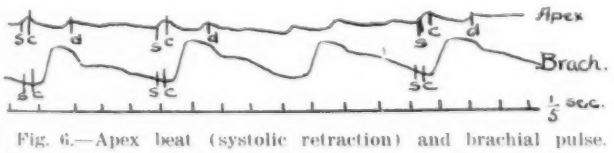


Fig. 6.—Apex beat (systolic retraction) and brachial pulse. Time relations: a—c=.16 sec.; c—d=.26 sec.; s—c=.043 sec.

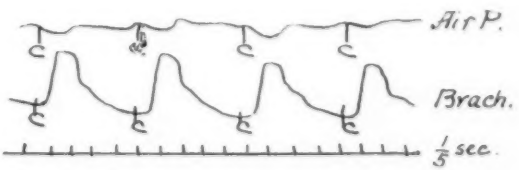


Fig. 8.—Pressure of air in mouth—glottis closed.

Fig. 9.—Same—glottis open.

DESCRIPTION OF THE FIGURES.

Car. = Pulse tracing over carotid artery.
Jug. = Pulse tracing over jugular vein.
Brach. = Pulse tracing from cuff applied to upper arm at 100 mm. hg. pressure.
Air P. = Tracing of pressure in air passages.
Resp. = Respiration I=Inspiration, E=Expiration.
c = time of carotid wave.
d = time of dicrotic notch on carotid pulse tracing.
a = time of wave due to auricular systole.
s = time of beginning of ventricular systole.

the hands, and a very definite capillary pulse in the finger nails, not present at other times. Moreover, extreme throbbing of the abdominal aorta is not uncommonly associated with palpitation of the heart, although not in the case described above. It seems, therefore, not improbable that the symptom of palpitation of the heart in the above-mentioned case, and perhaps in many others, may have been due entirely to the throbbing of the aorta and may be quite independent of the heart itself, since the latter showed no other signs of abnormal spontaneous or reflex action.

THE IRISH SCHOOL OF MEDICINE.[1]

By JAMES J. WALSH, M. D., PH. D.,

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[The main reason for my choice of the subject of the Irish School of Medicine is my own interest in it. A secondary though very important reason for the choice, is that Professor Osler, who is responsible, I suppose, for a great deal more of the medical thoughts that this generation thinks in America than either the generation itself gives him credit for or he himself might care to acknowledge, met me one day in New York, and finding that I was to be in Dublin, offered to give me letters of introduction that facilitated some study on the spot of the conditions in which the Irish School of Medicine developed. To his kind introduction to Sir John Moore and Sir Christopher Nixon, and Sir John Moore's recommendation to Sir Charles Cameron, whatever I may have to say owes any of value that it has. Sir Charles Cameron, especially, who is the historian of the Royal College of Surgeons in Ireland, proved an invaluable source of suggestions, hints, precious bits of information and references, that made further study easy and fruitful.]

It is with no idea of impressing the value of any narrow, national type of medical investigation or development in medicine that I have come to Johns Hopkins this evening. There are not many things in life that I deprecate more than scientific Chauvinism. I sincerely hope that the medical science of the future will be above and beyond all such limitations. Personally, I consider that one of the most interesting features of the Congress of Arts and Sciences at the Exposition at St. Louis was the fact that Russian and Japanese scientists cooperated in certain work for the Congress, though their countrymen on the other side of the globe were engaged in a bitter struggle over political matters. It is perhaps the most encouraging outlook for humanity at the present time that true science may raise men above the narrow national feeling that now drives them to war, and so help to usher in an era of universal peace that has been so long waited for but is surely coming.

I select "The Irish School of Medicine" as a topic for historical treatment because in the second quarter of the nineteenth century a trio of young men, physicians in Dublin, revolutionized the practice and the teaching of medicine by devoting themselves to the clinical investigation of disease, to the study of patients rather than to the elaboration of medical theories, and to the training of students to look to the condition of their individual patients rather than to any preconceived notions if they would make correct and helpful diagnosis and at the same time promote what is the dream of every young medical man, I hope, the development of this science of medicine of ours which is destined to accomplish so much for humanity.

Any single nationality has had very little to do with the development of our modern clinical medicine, and it is interesting to realize how medical progress has skipped from one country to another, quite contrary to what might have been expected from the influence of association and environment, and has received its best advances at the hands of genius wherever it might be and in spite of the discouraging influences that surrounded originality. Perhaps the most precious lesson in the history of clinical medicine is the fact that most of our discoveries came from young men, men under thirty-five, men as a rule somewhat out of the busiest current of medical thought in which the greatest progress might be expected, men whose initiative and genius for original investigation had not been smothered by the ineffectual attempt to master all the details of previously acquired medical information and technical methods.

The beginning of our modern clinical medicine came when Morgagni, at Bologna, began to keep notes of the cases that he saw clinically and compare them with the notes of the autopsies which he had the opportunity to see. This confrontation of bedside and autopsy room details seems so obvious to us now that we can scarcely think of it as a great discovery, yet great discovery it was, and the man who did it is the father of modern pathology, if we shall adopt Virchow's expression, and who was better able to judge? Morgagni began his note-taking when he was scarcely twenty, in a series of little books called Adversaria, the Latin name for note book, and these contained the foundations of modern medicine.

It might surely have been expected then that the next great step in medicine would come in Italy from some of the young men closely associated with Morgagni and with his practical methods of observation and pathological comparison. It did not, however, but came nearly a thousand miles away

[1] Read before the Johns Hopkins Hospital Historical Club, December 11, 1905.

in Vienna, where a young man named Auenbrugger, not yet 25 years old, began to realize that if he tapped with his finger on the chests of people suffering from various thoracic diseases he could tell something about the condition of the organs beneath his fingers from the sounds elicited by this tapping or percussion. For ten years he studied his patients carefully and had opportunities to make autopsies upon some of them. Then he published a little book containing not much more reading matter than a modern medical journal article of moderate length. This little book absolutely settled the subject of percussion and its value as a diagnostic medium in thoracic disease for all time.

There were two great professors of medicine in Vienna at this time, each of them writing systems of medicine. One, the famous Van Swieten, published some sixteen volumes on medicine, two of them with regard to thoracic diseases. Van Swieten does not even mention Auenbrugger's work, or the possibility of its having significance, though he does confess that thoracic diseases are the most difficult in diagnosis in the whole range of medicine. The other professor was De Haan, who also wrote extensively on medicine, some eleven volumes altogether, yet made no mention of Auenbrugger's work.

One might have expected that Auenbrugger himself would have thought of putting his ear down to the chest and so have discovered auscultation, but even genius makes but one step into the unknown. Auenbrugger's work did not receive proper credit until it was taken up by the French school under Corvisart, about thirty years later. Corvisart used the method of percussion on Napoleon, who thought it a very practical idea that a physician should try to learn something about his patient by such direct means rather than by looking at his tongue and feeling of his pulse. Accordingly, Corvisart was made professor at the University of Paris, and his protegé, Laennec, became impressed with the importance of Auenbrugger's work.

It was to Laennec that the world was to owe the diagnostic method of auscultation. He, too, began his successful studies on thoracic disease when he was under twenty-five. It took him about twelve years to complete his book on the subject. When he had finished it, the subject of auscultation had sprung as perfect from his brain as Minerva from that of Jove. Nothing further was needed to finish it. Some eighty years have passed since that time. There are three things, it is said by the recent biographer of Laennec with regard to auscultation in pulmonary diseases, that have been added since the original master's time. Their comparative insignificance can be best judged when I mention them. They are the *bruit d'airain* of Trousseau, the prolonged expiration at the end of expiration in the initial stage of pulmonary tuberculosis, and finally the dubiously significant sign, Bacelli's ægophony —only these after nearly a century of medical work to be added to the twelve years observation of one young man. Verily, in the words of Augustine Birrel at the end of his essay on Carlyle, "Fellow mortals, lend me your ears and let me whisper into their furry depths, don't let us quarrel with genius. We haven't any of it ourselves and the worst of it is we cannot get along without it."

It might have been expected then that Laennec, listening to so many chests, would have discovered the secrets of heart disease. Let me repeat, even genius makes only one step into the unknown. That was left for the Irish school of medicine, for Graves, Stokes, and Corrigan, and that is why I am going to talk this evening about this school.

It must not be thought that it is only in medicine that the history of discovery goes skipping round from country to country in the way that I have just detailed. A typical example of the contrary of any such false impression is easily to be seen in the sketch of the development of electricity at about the same time as these advances in clinical medicine were being made. Our own Franklin made the first step by demonstrating that the lightning and trivial electric phenomena here on earth were due to the same cause, though even in this he is said to have been anticipated by a Bohemian clergyman. The next step came from Galvani in Italy. Volta tried to contradict Galvani and made some great discoveries, but no further good work was done in Italy. The next step came, some 2000 miles away, from Oersted, a Dane, who showed the identity of magnetism and electricity. Then the distinguished French scientist Ampère, making his observations at Paris, developed this idea, while a German mathematical savant, Ohm, worked out the laws of resistance. After this English electrical scientists came in for a series of important observations and demonstrations in the rising science.

The first and most important name in the Irish School of Medicine is that of Dr. Robert Graves, who received his degree of bachelor of medicine at the University of Dublin in 1818. Undoubtedly his genius for original observation of high order was fostered by the fact that after his graduation he spent some time in most of the large cities of the world in which important work in medicine was being done. He was at London, for instance, for several months. He then spent three years on the continent, dividing his time between Berlin, Gottingen, Vienna, and Copenhagen, and eventually getting around to Paris and down to Italy, always noting what was being done in medicine wherever he wandered. Before returning to Dublin, he passed some months at Edinburgh and here was brought in contact with Stokes and Corrigan, who were later to be his colleagues in Dublin. Stokes and he became fast friends and remained such for the rest of their lives.

Like practically all of the great medical men who have proved to be original workers, Graves' interest was not confined alone to medicine. During his sojourn in Italy he became acquainted with Turner, the celebrated English landscape painter, and was his companion in many journeys. Graves himself was possessed of no mean artistic powers, as his friend Stokes tells us, and his sketches are characterized by natural vigor and truth. His thorough appreciation of

his companion, however, and the breadth of his sympathy and admiration for the great painter of nature can perhaps best be understood from some candid expressions of his with regard to their work in common. "I used to work away," he said, "for an hour or more and put down as well as I could every object in the scene before me, copying form and color as faithfully as was possible in the time. When our work was done and we compared drawings the difference was strange. I assure you there was not a single stroke in Turner's drawing that I could see like nature, not a line nor an object, and yet my work was worthless in comparison with his. The whole glory of the scene was there."

It is not too much to say that Graves owed not a little of his faculty for observation, for seeing things that others had missed, though readily to be perceived after he had pointed them out, to these educational experiences with the great artist. It is the power to observe more than the store of information that the medical student needs. As Dr. Stokes very well says: "In this large and truly liberal education, which embraced the training of the school, the university, and the world, we can discover in part the foundations of his subsequent eminence. He did not content himself, as is so commonly the case, with commencing—to use his own words —'the life of a practitioner without practice,' but he made himself intimate with the recent discoveries and modes of thinking in every great school of medicine, whether abroad or at home, and formed friendships with the leading physiologists and physicians of Europe, with many of whom he kept up a correspondence during his life."

Graves spent thirty years of fruitful study of medicine after this in Dublin, leaving his mark very prominently on every chapter of medical investigation that he took up—fevers, diseases of the chest, intestinal diseases, nervous diseases, and especially in diagnosis and treatment.

It is with regard to fevers especially that Graves' work will count for all time, because he set their treatment on so practical a basis. The trained nurse is quite a modern institution, yet seventy-five years ago Dr. Graves insisted that the services of a properly-qualified nurse in severe, continued fever are inestimable. He emphasized the necessity for moral management in fever, and friends and relatives are seldom capable of discharging this office.

"If they chance to discover from the physician's remarks or questions the weak points of the patient's case they generally contrive to let him know them in some way or another. If the patient is restless, for instance, the ill-judged anxiety of his friends will most certainly prevent him from sleeping. If he happens to take an opiate and they are aware of the nature of his medicine they will surely inform him of it in some way or another, though it may be only by a hint, and his anxiety for sleep conjoined with their disturbing inquiries prevents its due operation."

We are apt to think that the modern aphorism, nursing (meaning trained care), is more important than medicine in the treatment of fever, is the result of observations in our own day. Dr. Graves, however, felt very deeply that the most important element in the treatment was the conservation of the patient's strength with the preservation of his *morale*, and this can be best accomplished when the patient is constantly under the care of an experienced nurse, noting every symptom and saving every possible source of worry and every form of exhaustion of energy.

Another interesting anticipation of modern methods was with regard to child feeding in summer diarrhœa. It is often thought that only in recent years with the development of the science of bacteriology the danger of continuing milk feeding when infants are already ill in the summer time has come to be recognized. Milk is now known to be an excellent culture medium for various forms of bacteria, that is, it is a substance on which microbes grow plentifully, and it is often used in the laboratory to raise microbes. Dr. Graves, however, without any knowledge of modern bacteriology, but from clinical observation alone, pointed out that the only way to avoid a summer diarrhœa was to stop all milk feeding.

"Let the infant," he says, "abstain from milk in any shape for twenty-four hours, sometimes for the space of two, or even three, days. It is incredible how small a portion of milk, even in the most diluted state, will keep up this disease, acting like a species of poison on the intestinal mucous surface."

Even more interesting in these modern times, however, than Graves' attitude towards the treatment of fever is the position he took with regard to the habits of life that were best for the consumptive. At that time tuberculosis of the lungs was considered to be an inflammatory disease requiring the patient to be in the house most of the time, carefully protected from cold, and during any rise of temperature kept in warm rooms, and without any special encouragement to take food. Graves and Stokes changed all that, and for the time completly revolutionized the principles of treatment for this serious ailment. Alas, their work, notwithstanding the good results shown in a certain number of cases, failed to attract widespread attention and it was not until our own time that the principles they laid down as the rational basis of successful therapeutics for tuberculosis came to be generally adopted.

Graves insisted that his patients when suffering from beginning tuberculosis should not be confined to the house, but on the contrary should be out of doors most of the time. He emphasized what he called the taking of exercise, but in such a way that he agrees much more than might be thought with modern ideas on this subject. Now it is insisted that tuberculosis patients must not overtire themselves by taking exercise, though they must be out in the open air a large part of the time. Graves explains the exercises that he would like to have them take by saying that they should spend four or five hours every day riding in a carriage, or as he seems to prefer in an open jaunting-car. And that they should spend at least as much time sitting outside in quiet.

Besides this the most important element in treatment he

considers to be the encouragement of the appetite—as might be expected from the man who first fed fevers. His directions in this matter are very explicit, and he suggests various methods by which patients can be tempted to eat more and more food, and emphasizes the use of cereals and of milk and eggs as likely to be of most service in enabling these patients to gain in weight and strength so as to be able to resist the further advance of the disease. This, it may be said in passing, is just the ideal treatment for the consumptive at the present time.

Others of Graves' ideas in regard to tuberculosis are in general surprisingly modern. He insists, for instance, that the main causes of the disease are the overcrowding in towns, the long hours of hard work in factories, and the abuse of alcohol. He considers that the population of country places though fed no better as a rule than in the city do not develop the disease so frequently because of their opportunity for fresh air. He placed very little confidence in the idea that cold had anything to do with tuberculosis, though he disputed Laennec's dictum that bronchitis was never the beginning of tuberculosis. Graves advises his students not to try to protect their throats by means of mufflers, for this will only render them more liable to cold. His advice is rather to harden themselves against cold. For this he suggests the use of water plentifully on the chest and throat, to be employed not too cold during the winter time, unless one is used to it. He also suggests the use of vinegar and alcohol as hardening fluids. They should be applied freely, and in his experience were effective.

It is no wonder that Dr. Graves' work was properly appreciated even by those who were not his countrymen and who did not know him personally. The distinguished French clinician, Trousseau, at that time the leader of thought in European medicine, said of him:

"For many years I have spoken of Graves in my clinical lectures; I recommend the perusal of his work; I entreat those of my pupils who understand English to consider it as their breviary; I say and repeat that, of all the practical works published in our time, I am acquainted with none more useful, more intellectual, and I have always regretted that the clinical lectures of the great Dublin practitioner had not been translated into our language."

A little later in the same lecture he said:

"And, nevertheless, when he inculcated the necessity of giving nourishment in long-continued fevers, the Dublin physician, single-handed, assailed an opinion which appeared to be justified by the practice of all ages: for low diet was then regarded as an indispensable condition in the treatment of fevers. Had he rendered no other service than that of completely reversing the medical practice upon this point, Graves would, by that act alone, have acquired an indefeasible claim to our gratitude."

His tribute closes with the following very striking passage:

"I freely confess that I had some difficulty in accepting, notwithstanding the imposing authority of Graves, what he states of the influence of certain remedies, such as mercurials, essence of turpentine, spirituous preparations, nitrate of silver, etc.; but the Dublin Professor speaks with so much conviction that I ventured to follow his precepts, and I must say that my early trials very soon encouraged me to adopt unreservedly what at first I accepted only with misgiving. There is not a day that I do not in my practice employ some of the modes of treatment which Graves excels in describing with the minuteness of the true practitioner, and not a day that I do not, from the bottom of my heart, thank the Dublin physician for the information he has given me.

"Graves is, in my acceptation of the term, a perfect clinical teacher. An attentive observer, a profound philosopher, an ingenious artist, an able therapeutist, he commends to our admiration the art whose domain he enlarges, and the practice which he renders more useful and more fertile."

The second of the great leaders of the Irish School of Medicine is William Stokes, the son of the Regius Professor of the Practice of Medicine of Trinity College, a post to which in due course of time he succeeded. As a boy he was not much given to study and, indeed, was somewhat the despair of his parents. He spent much of his time in reading poetry and romance, and the Scottish Border Ballads, which had just then been made so popular by Sir Walter Scott, were his favorite readings. He is said to have spent days in committing them to memory. This was a source of special anxiety to his mother, and one day, having fallen asleep while reading his favorite author, Sir Walter Scott, he was awakened by her tears falling on him as she bent over him. It is said that after this the dreamy indolent boy became the ardent and enthusiastic student. His love, however, for the olden times never left him and he remained a faithful student of Celtic antiquities and, indeed, his daughter is one of the authorities on this subject.

Stokes amply made up for any neglect of study there might have been in his boyhood days as soon as he entered upon the medical course to which he felt called. Here he came to be looked upon as one of the most ardent and painstaking of students.

His preliminary medical studies were begun in Dublin at the Meath Hospital. Chemistry he learned in the laboratory of Trinity College, and anatomy in the Royal College of Surgeons. After spending several years thus he went to Glasgow where for two years more he was occupied mainly at chemistry in the laboratory of Professor Thompson. Like most of the young Irishmen of his time, he next proceeded to Edinburgh in order to complete his education in clinical medicine and if possible obtain his medical degree from that famous institution. It was at Edinburgh, under the magnetic influence of that great teacher, Allison, that Stokes began to develop the rare powers of original observation which at an early age placed him in the front rank of the best medical men of the time.

It is interesting to note that before he left Edinburgh he published his first medical work, a treatise on the use of the stethoscope, which was undoubtedly the means of bringing that instrument—and with it Laennec's fruitful system of physical diagnosis by means of auscultation—to the general notice of the English-speaking medical profession. Even after all that has been written on the subject, it remains a very valuable little book. It was dedicated to the famous Cullen, who had already published a series of cases which had been illustrated by the use of the stethoscope and to whom Stokes probably owed the idea of the need for a formal little treatise on the subject. It is typical of the slow adoption of medical novelties that more than ten years afterwards, old time, though distinguished, physicians not infrequently made fun of Stokes for spending so much time in the study of cases with the stethoscope, since they were apt to consider it as little more than a toy. Stokes, however, intensely practical in his way, realized the value of the instrument, and as the result of his teaching it soon began to be more generally used, thus introducing that exact knowledge of diseases of the chest, which can only be obtained by means of this little instrument and the methods of auscultation which are associated with it.

Perhaps the most interesting phases of Stokes' purely medical work during the first part of his career is his treatment of the subject of consumption. When not quite thirty-three he wrote a treatise on the diagnosis and treatment of diseases of the chest. His familiarity with the work of Graves and of Auenbrugger gave him command of all the modern methods of physical diagnosis, so that he was able to study tuberculosis to the best possible advantage and with the least possible chance of too favorable judgment with regard to its cure. Notwithstanding the accuracy of his knowledge, however, he insisted that the disease was curable and that the important point with regard to it was the recognition of it as early as possible, in order that the patient might be given the best chance for life.

At that time most physicians considered tuberculosis to be an hereditary disease, without any idea of its being possibly contagious, and this idea of heredity seemed to set the stamp of inevitable fatality on the heads of victims of the disease. To announce the curability of tuberculosis then was to run counter to all the medical traditions of the time, and Stokes in doing so must have had in support of his teaching many observations of patients who had been cured notwithstanding the fact that they were assured sufferers from this supposedly fatal disease. We know at the present time that Stokes was surely correct in his judgment in this matter, and realize too that his method of treatment, which included abundant feeding and long hours each day in the outdoor air, constitutes the best elements of the modern treatment of tuberculosis.

Stokes devoted most of his life to the study of diseases of the chest and undoubtedly came to be one of the best diagnosticians in heart disease that the world has ever known. Down even to the present time his book is an authority on the subject and will remain so unless some new method of physical diagnosis makes revelations hitherto undreamt of in regard to heart affections. It is rather interesting to find then that Stokes, far from insisting on how wonderfully exact in detail cardiac diagnosis has become, rather deprecates the pretension of too exact diagnosis so common among younger heart specialists. As a matter of fact, I know no set of expressions likely to encourage a young man more in his study of heart cases than Stokes' modest disclaimer on his part, of being able to tell many things that are supposed to be clear to the expert, and his insistence that too much is claimed for the possibilities of cardiac diagnosis. He says:

"We read that a murmur with the first sound, under certain circumstances, indicates lesion of the mitral valves. And, again, that a murmur with the second sound has this or that value. All this may be very true, but is it always easy to determine which of the sounds is the first, and which the second? Every candid observer must answer this question in the negative. In certain cases of weakened hearts acting rapidly and irregularly, it is often scarcely possible to determine the point. Again, even where the pulsations of the heart are not much increased in rapidity, it sometimes, when a loud murmur exists, becomes difficult to say with which sound the murmur is associated. The murmur may mask not only the sound with which it is properly synchronous, but also that with which it has no connection, so that in some cases even of regularly acting hearts, with a distinct systolic impulse, and the back stroke with the second sound, nothing is to be heard but one loud murmur.

"So great is the difficulty in some cases, that we cannot resist altering our opinions from day to day as to which is the first and which the second sound. . . .

"To the inexperienced the detailed descriptions of such phenomena as the intensification of the sounds of the pulmonary valves, of constrictive murmurs as distinguished from non-constrictive; of associations of different murmurs at the opposite sides of the heart; of pre-systolic and post-systolic, pre-diastolic and post-diastolic murmurs, act injuriously first, by conveying the idea that the separate existence of these phenomena is certain, and that their diagnostic value is established; and secondly, by diverting attention from the great object, which—it cannot be too often repeated—is to ascertain if the murmur proceeds from an organic cause, and, again, to determine the vital and physical state of the cavities of the heart. . . .

"If the question as to the practicability of the negative diagnosis, with reference to either orifice, be raised, it appears probable that where a mitral murmur is manifest it will be easier to determine the absence of disease of the aortic valves than to declare the integrity of the mitral valves in a case of aortic patency. The experience of each succeeding day devoted to the study of diseases of the heart will make us less and less confident in pronouncing as to the absence of

disease in any one orifice, although no physical sign of such a lesion exist, if there be manifest disease in another, or, again, if there be symptoms of an organic affection of the heart."

Both Graves and Stokes insisted very much on the necessity of bedside teaching for medical students. It is surprising to think that considerably more than half a century passed away before anything like an organized effort was made to put into practice generally their counsels in this matter. Every one admitted the necessity, but every one feared the labor involved. Graves particularly railed at the fact that medical students were sent out to practice without ever having written a prescription. Men were taught all sorts of things in their medical course but not the practice of medicine. Thanks to the labors of Professor Osler, at last the opprobrium of absence of bedside teaching is gradually passing away. There is another phase of the subject of teaching on which Stokes had something to say that remains of interest, however, and from his words a precious lesson for the present generation might be gleaned. He makes the application of his words to all teaching, as well as that of medicine, and personally I think that his expressions might well be printed as a motto for every class-room:

"One word as to the duty of teachers, and this applies to those of other sciences as well as medicine. It is not to convey all the facts of a subject to their hearers, but it is, by precept and example, to teach them how to teach and guide themselves. If they succeed in this they have done their duty in the largest sense of the word."

On another occasion Stokes stated more definitely what he considered the duty of the medical teacher. "To teach the individual pupil, to encourage him to learn, to show him how to teach himself, to bring him into the true relation in which he ought to stand with his instructors, to make him familiar with bedside medicine, to show him the value of every new fact and observation in medicine, and to have him know the duties as well as make him face the pleasure of original investigation. These are the duties of the teacher in medicine."

Perhaps the most salient trait in Dr. Stokes' character was his treatment of the poor. He was kindness itself even to the most abject. The smile with which even those who were suffering severely greeted his arrival was the best evidence of this. After this, his great characteristic was his sympathy with his professional brethren. He succeeded in obtaining for the Irish physicians who devoted themselves to the care of the poor for the miserable pittance allowed by government, better conditions than those which had hitherto obtained, by representing very strongly to a Parliamentary committee that the death rate among Irish physicians, owing to the prevalence of virulent fever in Ireland, was nearly twice as high as that among army officers in the field during war times.

One tribute to his goodness of heart from the pen of a personal friend who had known him for many years seems to deserve a place at the close of this short sketch of his career:

"Those who have seen Dr. Stokes at the bedside of the sick know how gentle, how refined, how kindly was his bearing towards the patient. Amid all the ardor of clinical observation and research he never for one moment forgot the sufferer before him—no thoughtless word from his lips, no rough or unkind action ever ruffled the calm confidence reposed in him by those who sought his skill and care. In many eloquent lectures delivered in the Meath Hospital he inculcated those Christian lessons of charity and thoughtfulness; and so by precept and example he strove to teach the duties of a true and God-fearing physician."

The third of the Irish School is Sir Dominic Corrigan, whose name is probably more familiar to the ordinary student of medicine than either of his distinguished colleagues, because of its association with the form of pulse which occurs in aortic heart disease. Corrigan's career should prove a stimulating example to the young physician just taking up that real post-graduate work in medicine which comes after he has received his degree, finished, perhaps, his hospital work, and is beginning his practice. Corrigan was only twenty-seven when he began the series of observations on which was founded his paper on aortic heart disease, which was published when he was about thirty. In this matter of youthful accomplishment, Corrigan is not alone among his distinguished Irish contemporaries. Stokes, it will be remembered, wrote his little book on the stethoscope when he was only twenty-one, and had made some very important observations on diseases of the chest before he reached the age of thirty. Graves had showed very clearly the sound metal of his intelligence before he was twenty-five, and had described the cases of the nervous diseases which have since come to be called after his name, Graves disease, before his third decade had run more than a year or two. In fact, these young men accomplished so much by their careful observation and dependence on their own resources that the medical writer of the modern times is tempted to wonder if perhaps that most precious quality of the human mind in the young adult, its originality, is not obscured by the amount of information that it is expected to digest before it is tempted to do any thinking for itself.

There is another remarkable feature of Corrigan's achievement, in the recognition and description of this form of heart disease. At the time he was the physician to a hospital which had only room for six medical patients. This appointment to the little Jervis Street Hospital in Dublin had been secured only after competition, and Corrigan had to pay for the privilege of being the attending physician. This he could ill afford to do at the time, and so he resolved to make all his opportunities for the study of patients count to the greatest possible extent. He did not visit his hospital merely to see patients, but to study the cases carefully. His success is only another example of the necessity for seeing much, and not

many things, if there is to be any real progress. In our day, physicians scarcely consider that they have any hospital experience unless they are the attending physicians to several hospitals, seeing at least one hundred patients a week. The result is that patients do not receive the skilled care they should, and that advance in medicine suffers because of the wasted opportunities for clinical observation while a busy attending physician rushes through a ward and the resident physician has only time for the routine work that enables him to keep just sufficiently in touch with the progress of his cases to satisfy the hurrying chief physican.

Before publishing his classic paper on the permanent patency of the aortic valve, on which his reputation as a wonderful clinical observer in medicine rests, Corrigan had called attention to some mistakes in the classification of heart murmurs made by Laennec in Paris. At this time Laennec was considered to be the best authority in Europe on diseases within the thorax. As regards diseases of the lungs, he well deserved the reputation. It is to him that the medical world owes all that it knows about diseases of the chest as far as these can be detected by means of the ear. His young contemporary in Ireland, however, was able to show that in diseases of the heart some of the ideas acquired in long years of study of the lungs were leading Laennec into false conclusions as regards the significance of murmurs in the heart. Even genius does not often succeed in doing more than one thing well, and while the Frenchman might have been thought just the one to complete the work begun on the heart this duty was to devolve on his Irish contemporaries.

Any one who wishes to realize how well Corrigan did his work should turn to that marvellously concise, complete article from which I select only the author's division of aortic heart affection:

"The morbid affections of the valves and aorta permitting this regurgitation are the following:

"1st. The valves may be absorbed in patches, and thus become reticulated and present holes, through which the blood flows back into the ventricle.

"2d. One or more of the valves may be ruptured; the ruptured valves when pressed, flapping back into the ventricle instead of catching and supporting the column of blood in the aorta, the blood then regurgitating through the space left by the broken valves.

"3d. The valves may be tightened or curled in against the sides of the aorta, so that they cannot spread across its mouth; and an opening is then left between the valves, in the center of the vessel, through which the blood flows freely back into the ventricle.

"4th. The valves without any proper organic lesion may be rendered inadequate to their function by dilatation of the mouth of the aorta. The aorta affected by aneurism, or dilated, as it frequently is in elderly persons, about its arch, will sometimes have the dilatation extending to the mouth of the vessel, and in such a case the valves become inadequate to their function, not from any disease in themselves, but from the mouth of the aorta dilating to such a diameter as to render the valves unable to meet its center; the blood then, as in the other instances, regurgitates freely into the ventricle."

I doubt if any better classification has been made even after three quarters of a century of additional study.

Another very distinct contribution of Corrigan to the medicine of his time was his insistence on the distinction that existed between typhoid and typhus fever. This is one of the most interesting features of his little book on the "Nature and Treatment of Fever." With our present knowledge, it seems hard to understand that these two fevers should have been so long confounded, but, as a matter of fact, it was not until the middle of the nineteenth century that the distinction between them was recognized even by the most acute observers. In this matter the French and Americans anticipated most of the rest of the world, though Corrigan's teaching in the matter had been correct for many years before others in the British Isles came to the true position.

Within a few years after his essay on aortic heart disease, Corrigan published a paper on chronic pneumonia or, as he called it, cirrhosis of the lungs. Corrigan's successful achievements in medicine depended mainly on the fact that he studied the pathological anatomy of fatal cases with the greatest care. He had detected that in certain cases of chronic pneumonia the process seemed to be quite different from that of tuberculosis. Observations, made post mortem, showed that his clinical observations were justified by the differences observed in the organ. As a result he formulated his opinions on the subject. He called particular attention to the fact that what he found corresponded very closely with the pathological process that had been observed by Laennec in the liver, and to which the French medical pathologist had given the name of cirrhosis. It would seem as though the pathology of the time was so crude that Corrigan must surely fall into serious error in his account of what he saw. Twenty years later, Virchow was to revolutionize pathology by the publication of his "Cellular Pathology." Notwithstanding the progress made since his time, however, Corrigan's description of the condition of the lungs that he noted, and of the pathological process observed, is so true that even to the present day this paper remains of distinct value in medicine and represents the beginning of correct ideas on the subject.

After Corrigan's death in 1880, the London *Lancet* said: "In the light of recent pathology Corrigan's speculations on cirrhosis of the lungs are more meritorious than ever and continue to be regarded as in the main sound. They anticipated by forty years much of the present pathology." Needless to say it is only a genius of a very high order that is thus capable of rising above the limitations of its environment.

The Irish School of Medicine has in Graves and Stokes and Corrigan a greater group of contemporaries than has been given to any other nation at one time. If we were to eliminate from nineteenth century medicine all of the inspiration derived from their work there would be much of value

that would be lacking from the history of medical progress. These men were deeply imbued with the professional side of their work as physicians, and were not, in any sense of the word, money-makers. Another very interesting phase in all their careers is that no one of them occupied himself exclusively with medical studies. All of them had hobbies followed faithfully and successfully together with medicine, and all of them were deeply interested in the uplifting of the medical profession, especially in securing the rights of its members and saving poor sick people from exploitation by quacks and charlatans. All of them gave of their time, their most precious possession, for the political and social interests of their fellow men, and felt in so doing that they were only accomplishing their duty in helping their generation to solve the problems that lay immediately before them.

Undoubtedly the most important lesson of the work of the Irish School of Medicine is that real advances in medical teaching and science are due much more to clinical observation, the actual careful study of patients, than to the application of supposed theoretic principles of science that seem to explain much. Always in the history of medicine there has been an abundance of theory and most of it has been outlived in the course of time. Clinical observation, however, even when for a moment its significance may be mistaken, always retains a permanent value. In our age we are no different from those of former generations, and while we may consider that laboratory work apart from the patient will do much to explain disease, and help medicine, we are likely to find that in this we are as much mistaken as have been our forefathers whenever they abandoned the close study of groups of patients.

There is no doubt that there is as much room for advance in medicine by clinical observation at the present moment as there has been at any time in the history of our science. It is not at all improbable that, for instance, the infectious diseases will prove to be more numerous than they have so far been considered. It took a long time for even acute medical observers, and nowhere is this clearer than in studying the Irish School of Medicine, to realize that typhoid fever was quite distinct from typhus fever, and our generation has seen the practical acceptance of a third disease in the group, paratyphoid fever, and has come to the threshold of the thought that there are further disease entities in this same series. The scarlatina-measles group has been increased by a third disease, German measles, and probably also by a fourth, the so-called Duke's fourth disease.

There remain other disease groups that need differentiation very sadly. It has been pointed out over and over again that the word rheumatism covers a multitude of diagnostic sins and shortcomings and forms an excuse for lack of thoughtful observation of patients. The uric acid diathesis has been an abomination for half a century and is only now beginning to find its way properly into the limbo of things to be forgotten. The word neurasthenia has been almost as much abused as rheumatism and has proved just as fruitful of evil in preventing proper differentiation of diseased conditions. There seems no doubt that such words as hysteria and functional neurosis of various kinds are being abused in the same way. As a matter of fact, words are constantly serving as cloaks for ignorance and as excuses for negligence. Malaria as a universal refuge has gone out to a great extent, but since the great epidemic of 1890 influenza has come into explain most of the obscure febrile conditions of the winter time.

Our hope must be that the young men, for it is always the man under thirty-five who does original work in medicine of higher order, will not accept these ready-made substitutes for thought and observation, but will set himself to the problem of further developing diagnosis in the practice of medicine. The work of Graves and Stokes and Corrigan, the best elements of which saw the light before they were thirty, is a proof of how much can be accomplished by men who will try to see things for themselves without being prejudiced by the loose indefinite notions of the past, wrapped up though they may be in taking theory.

JOHN HUXHAM OF DEVONSHIRE (1692-1768).[1]

By William J. Vogeler, M. D.

John Huxham, who at the beginning of the 18th century enjoyed more than a local reputation both as a writer and a physician, is stated by some, apparently on insufficient evidence, to have been born the son of a butcher of Haberton. Though the reports of his parentage are at variance, it seems well ascertained that he was actually born at Totness, in the county of Devonshire, England, in or about the year 1692.

By most careful and industrious habits (traits that he handed down to his son), Huxham's father had acquired a small estate in the parish of Staverton, which became the property of this, his eldest son, who disposed of most of it when he reached the age of 21, to defray the expenses of his medical education. According to Edward Meeres, whose excellent account of Huxham's early life I have carefully followed, as being the most accurate, he was left to the guardianship of a Mr. Thomas Edgeley, a dissenting minister of Totness; but in a short time he was removed to a private academy at Exeter. Selecting medicine for his profession Huxham proceeded to Leyden, and was entered on the Physic line in 1715, being then 23 years of age; how he had been occupied for some years before this is not known.

The University of Leyden was then at the zenith of its reputation and Boerhaave in his prime; his reputation was more

[1] Read before the Johns Hopkins Historical Club, March 13, 1905.

than European, and students were flocking from all parts of the civilized world to hear him—in fact, so well known was he that any letter from distant parts of the world addressed to "Boerhaave, Europe," would reach its destination. Huxham, it is said, shared in the general admiration and enthusiasm, and most of his future excellence and success may be traced to his lifelong recollection of the example and exhortation of his celebrated teacher.

Although in later years his practice made him more than a wealthy man, at this time Huxham's pecuniary means were inadequate to complete the usual course of study for a medical degree at Leyden which extended over a period of three years, so after a time he left, going to Rheims, where he took the degree of Doctor of Medicine.

JOHN HUXHAM OF DEVONSHIRE (1692-1768).

On his return to England, he first settled at Totness, but soon removed to Plymouth to take up his abode with Mr. Colker, one of the most influential of the Plymouth dissenters. He not long afterward married, with the view (Meeres tells us) of securing the additional advantage of family interest.

Huxham neglected no efforts which he thought might conduce to his professional advancement, and believing that the appearance of being extensively sought for and employed was one of the most certain means of actually becoming so, descended to expedients, which his better judgment could not have approved. He would, it is said, go to Chapel, order his servants to call him out in haste, when he was not really wanted, get upon his horse and ride furiously out of one gate of the town and in at the other. He affected great gravity, dignity of manner, and peculiarity of dress, and wore as his ordinary costume, a scarlet coat with ruffles at the wrist and a cocked hat—scarlet, I may observe, was sometimes, though rarely, worn by a few physicians of the 17th century, as was common with Mead and a few others. He carried a gold-headed cane, and in hot weather had his man-servant following him, carrying his gloves.

Notwithstanding these efforts, Dr. Huxham's progress for some years was slow, and it was not until the death of Dr. Seymour, who then engrossed the medical practice of Plymouth and vicinity, that Huxham made much advance. This period, however, was not lost; if he did not add greatly to his practical knowledge, he constantly increased his stock of medical learning. How deeply he was read in the great medical authorities of Greece and Rome, his published works testify. Hippocrates, he regarded with the utmost veneration, and in his "Essay on Fevers" he speaks thus of his estimation of the medical writings of antiquity, "I will not take upon me to say a person cannot be a good physician without consulting that great oracle of physic (meaning Hippocrates) and reading the ancients, but this let me say, he will make a much better physician for so doing, and I believe few, if any, ever made any considerable figure in the profession who had not studied them."

Although, at Plymouth, he had several competitors of character and great respectability, none were able to compete with him in energy and assiduity, none in extent of professional knowledge or in the tact with which he applied it to the recognition and alleviation of disease. His aptitude in seizing on the really important points of a case, and his facility in the selection of means wherewith to meet them, are points in his professional character which, handed down by tradition, are abundantly exemplified in his writings. Though bred a Dissenter, he, after a time, conformed to the Established Church, a change which doubtless tended to his professional advancement.

Huxham was twice married, and in his second volume of "Observations," he gives a pathetic account of the death of his wife, who died in 1742, aged 40 years, of dropsy, after having been twice tapped. He had two daughters and one son, John Corham Huxham, who graduated from Exeter College, Oxford, became F. R. S. and edited several of his father's works. In 1739 Huxham was elected Fellow of the Royal Society, and an honorary fellow of the College of Physicians of Edinburgh in 1735; in that year also the Royal Society awarded him the Copley Medal for his observations upon Antimony. By a long and successful practice he accumulated a considerable fortune, died on August 11, 1768, aged 76, and was buried on the north side of St. Andrew's Church, Plymouth.

II. Writings.

Huxham early distinguished himself as a writer—his first contribution to the "Philosophical Transactions" having appeared in 1723.

I. In 1731 he wrote "Observations on Air and Epidemic Diseases" (Observationes de aere et Morbis epidemicis), of which a second edition appeared in 1752, and a third volume,

after his death in 1770. These two volumes contain daily observations on the weather and the prevailing diseases, and the object was to ascertain the relation between atmospheric condition and disease, a subject probably suggested by the writings of Sydenham, who years before had studied along the same line.

II. In 1739 appeared the book on which the author's fame chiefly rests, his "Essay on Fevers" (etc.). In this he describes the course and treatment of simple fevers, nervous fevers (in which the modern typhoid is included, and in which, as Dr. Osler puts it, he had "taken notice of the very great difference there is between the putrid malignant and the slow nervous fever"). In this work also appear small-pox, pleurisy, inflammation of the lungs and bronchitis (then designated peri-pneumonia notha). This essay was received with the greatest applause and gained for him a European reputation. It reappeared in 1750, 1757, and 1764, and reprints of the last edition (4th) in '67, '69 and '82. The work was translated into Latin and into most of the European languages. The accuracy of his descriptions and the practical value of his distinctions have never been seriously questioned. Huxham's French biographer as late as 1822 asserts that it is infinitely superior to any treatise on fever which has been subsequently published in England, not even excepting that of Cullen; whilst the German historian of medicine, Sprengel, admits it to be the best that appeared during the first half of that century.

A high mark of distinction befell Dr. Huxham in consequence of this publication described by Polwhele as follows: "The Queen of Portugal being ill of a fever, and being reduced to the last extremity notwithstanding the efforts of a physician of the country, his majesty hearing of the eminence of a physician of the factory at Lisbon, sent for him and inquired if it were in his power to give any assistance? He replied in the affirmative, the disorder took a favorable turn and in a short time the Queen was restored to perfect health. The doctor being complimented by the King upon his ability and success, said he had no claim to the application, that the merit was due to Dr. Huxham, an eminent physician of Plymouth, whose tract on the management of fevers he had implicitly followed. Upon which the King immediately procured the treatment, had it translated into the Portuguese language and sent it richly bound to Huxham, as an acknowledgment of his debt of gratitude on the recovery of the Queen."

The chapters of the book are full of original observations and are written in a lucid style. The author, in fact, seems to derive most of his information from his own observations, and though he copies none, is clearly a follower of Sydenham, a student of sick men rather than of physician's books, but at the same time eager to recognize and apply remarks drawn from original observations whenever he meets them in the works of the ancients or of modern. He more than once quotes with praise the remarks of Hippocrates, that "whoever knows the nature of the disease knows the method of care," but he is at the same time careful and rational in his use of drugs and general method of treatment, and to show this it might be well mentioned here that the compound tincture of cinchona bark, at present in the British Pharmacopœia, which also contains bitter orange peel, serpentary root, saffron and cochineal mixed with spirits, was devised by him, and was for some time called Huxham's tincture, the original formula still holding good!

III. In 1747 (30th September) he wrote from Plymouth to the "General Evening Post" on the occasion of the return after a voyage of only thirteen weeks, of Admiral Martin's fleet with 1200 men disabled by scurvy, recommending vegetable food as a preventive and urging a fuller supply of it to the Navy. These remarks with additions were reprinted as a book, entitled "De scurbuto," at Venice in 1776.

IV. In 1752 he published a short book, "De Morbo Colico Domnomiensi" (Devonshire colic). He describes very justly the symptoms of the terrible disease, which was formerly quite a scourge in the west of England, and tries hard to explain them, but without success. He was keen enough to observe that the colic was commonest when the fresh cider came, but it was reserved for Sir George Baker in 1767 (on the authority, however, of Huxham's previous description of the symptoms) to observe that the real cause was the lead used in the apple presses and dissolved by the cider, Devonshire colic being nothing more or less than lead poisoning, "causing obstruction of the bowels, paralysis and death."

V. Medical and chemical observations upon Antimony, originally published in the Phil. Trans by the Royal Society, subsequently appeared in book form, giving a full account of the method of preparing and prescribing antimonial medicines. A preparation of this important medicine was formerly vended under the name "Huxham's Antimonial Wine."

VI. In 1757 appeared a dissertation "On the malignant, ulcerous sore throat," which contains an excellent account of what is now called diphtheria and he deserves the credit of being the first to observe the palsy of the soft palate common to the disease, but failed to distinguish cases of diphtheria from those of scarlatina anginosa.

VII. In addition to the important works just mentioned, Dr. Huxham published several papers in the Philosophical Transactions, which, after his death, were collected into a very small volume by his son. They are:

I. Anomalous, epidemic small-pox.

II. Letter to Dr. Mortimer, Concerning polypi of the heart.

III. Letter to Dr. Mortimer, Case of Hannah Hitchcock.

IV. Letter to Thomas Slack, Venereal case.

V. Letter to Dr. ————, Emphysema.

His works have appeared in numerous editions, and his writings published as late as 1829 in Leipsic, under editorship of Hænel as part of the "Scriptorum classicorum de Praxi Medica nonullorum opera collecta."

Conclusion.

In conclusion it might be well to sum up the qualities of the man, good and bad. In spite of the fact that in the early days of his practice he may have descended to expedients

which were not all the most lofty, still in his works his main object was simplicity, and he wrote so clearly that everyone could understand him, following the motto of his illustrious teacher, Boerhaave, "Simplex sigillum veri." With industry he combined perseverance and the courage to express his opinions boldly, when founded on what he honestly felt to be the truth, and if not the whole truth, nothing but the truth.

He had a patience that was inexhaustible, a devotion to labor unsurpassed, and a slow but sure and reliant comprehension. He combined with a stolid firmness a rare talent for penetration into hitherto obscure problems, and for casting aside objects which were coincident or accidental.

As Sir Benjamin Richardson has said of Sydenham, so it might be said of Huxham, "He wrote from what he saw in medicine and his sphere was the sick room. He had not many remedies, and what he had he used sparingly but he did his work with precision and therefore with confidence." The faculties of the man were well balanced and so strong that they would have been powerful in any age. It was fortunate for him and for us that they came into operation just at a time when they could be applied with the greatest advantage to their owner and to the world.

Finally what better can be said of any man than that he was a reader of Hippocrates, a scholar of Boerhaave, a follower of Sydenham, and a contemporary of William and John Hunter.

POPULAR MEDICINE IN THE EIGHTEENTH CENTURY.

By Eben C. Hill.

As is apparent in the many semi-scientific articles which have appeared during late years, the present tendency in medicine is toward small doses frequently administered rather than the large "tablespoonfuls" which in olden times made the visit of the physician so dreaded by the defenseless patient. The heroic doses of Castor oil were not disguised and the ever ready "bitters" were everything that the name signifies. In the present day, however, the fear of injuring the patient by some ill-chosen remedy is so great that the doses are small and the maxim most frequently emphasized in all lectures on therapeutics is "do no harm even if you can do no good."

It is not the purpose of this sketch to elaborate the causes which have produced these marked changes, for they have been most thoroughly discussed, and it is sufficient to say that science now fully appreciates that no drug is specific in its action and that each decoction is a many-edged tool. However, in looking through some old medical books I found a small leather-bound volume written by John Wesley, M. A., during the middle part of the eighteenth century, a few extracts from which will give an interesting survey of the popular materia medica of his time. The work was intended more especially to aid the clergy in meeting the frequent demands of their flock in cases where physicians were not easily accessible. It met with greater popularity than was anticipated by its author, however, and the book passed through twenty or more editions.

The purpose of the work is characteristically set forth in the preface, and although throughout the treatise the good Wesley maintained a scientific attitude, yet it has many quaint touches of theology. I have taken a few extracts from this preface in order to show how logically he justifies himself for presenting the public with remedies to avoid the pain and suffering which he confesses are sent as a punishment for the sins of our forefathers:

When man came first out of the hands of the great Creator clothed in body as well as in soul, with immortality and incorruption, there was no place for physic, or the art of healing. As he knew no sin, so he knew no pain, no sickness, weakness or bodily disorder. The habitation wherein the angelic mind, the *Divinæ particula Auræ* abode, though originally formed out of the dust of the earth, was liable to no decay. It had no seeds of corruption or dissolution within itself. And there was nothing without to injure it: Heaven and earth and all the hosts were mild, benign and friendly to human nature. The entire creation was at peace with man, so long as man was at peace with his Creator. So that well might "the morning stars sing together and all the sons of God shout for joy."

But since man rebelled against the Sovereign of the earth and heaven, how entirely is the scene changed! The incorruptible frame hath put on corruption, the immortal hath put on mortality. The seeds of weakness and pain, of sickness and death, are now lodged in our inmost substance; whence a thousand disorders spring without the aid of external violence. And how is the number of these increased by everything round about us! The heavens, the earth and all things contained therein, conspire to punish the rebels against their Creator. The sun and moon shed unwholesome influences from above; the earth exhales poisonous damps from beneath; the beasts of the field, the birds of the air, the fishes of the sea, are in a state of hostility; the air that surrounds us on every side is replete with the shafts of death: yea the food we eat, daily saps the foundation of the life which cannot be sustained without it. So has the Lord of all secured the execution of his decree—"Dust thou art and unto dust thou shalt return."

But can there nothing be found to lessen these inconveniences, which cannot be wholly removed? To soften the evils of life, and prevent in part the sickness and pain to which we are continually exposed? Without question there may. One grand preventive of pain and sickness of various kinds, seems intimated by the great Author of nature in the very sentence that entails death upon us: "In the sweat of thy face shalt thou eat bread till thou return to the ground." The power of exercise, both to preserve and restore health, is greater than can be well conceived; especially in those who add temperance thereto; who if they do not confine themselves altogether to eat either "bread or the herb of the field" (which God does not require them to do) yet steadily observe both the kind and measure of food which experience shows to be most friendly to health and strength.

'Tis probable, physic, as well as religion, was in the first ages chiefly traditional: every father delivering down to his sons, what he had himself in like manner received, concerning the manner of healing both outward hurts and the diseases incident to each climate, and the medicines which were of the greatest efficacy for the cure of each disorder. . . .

* * * * * * * * * *

As to the manner of using the medicines here set down I should advise: As soon as you know your distemper (which is very easy, unless in a complication of disorders, and then you would do well to apply to a physician that fears God): First. Use the first of the remedies for the disease which occurs in the ensuing collection (unless some other of them be easier to be had, and then it may do just as well). Secondly. After a competent time, if it takes no effect, use the second, the third, and so on. . . . . Third. Observe all the time the greatest exactness in your regimen or manner of living. . . . Drink only water if it agrees with your stomach; if not, good, clear, small beer. Above all, add to the rest (for it is not labor lost), that old unfashionable medicine—prayer.

Then follow some general rules of life, among which we find:

Malt liquors (except clear, small beer, or small ale, of a due age), are exceedingly hurtful to tender persons. Such persons ought constantly to go to bed about nine and rise at four or five. Those who read or write much should learn to do it standing; otherwise it will impair their health.

In the postscript to a more recent edition published in 1755 we find expressions of pleasurable surprise at the popularity of the book, and in mentioning the additions to this new edition there is an interesting apology for the omission of certain "strong drugs." He writes:

It is because they are not safe, but extremely dangerous, that I have omitted together with antimony the four Herculean medicines—opium, the bark, steel, and most of the preparations of quicksilver. Herculean indeed! Far too strong for common men to grapple with. How many fatal effects have these produced, even in the hands of no ordinary physicians? And whereas quicksilver, the fifth, is in its native form as innocent as bread or water: has not the art been discovered so to prepare it as to make it the most deadly of all poisons? . . . But they have not yet taught them how to wound at a distance: and honest men are under no necessity of touching them, or coming within their reach.

In uncommon or complicated diseases, where life is more immediately in danger, I again advise every man, without delay, to apply to a physician that fears God. . . . From one who does not, be his fame ever so great, I should expect a curse rather than a blessing.

After this excellent advice follows the "collection of receipts." Those remedies which the good Wesley from personal experience could recommend were marked with an asterisk. The diseases are arranged alphabetically, and I have selected a few at random. The cold bath and drinking water either sitting or standing seemed to be the most frequently prescribed, though being "electrified" seemed to have produced most satisfactory results. There is no explanation of just how this was to be done, but it was almost a panacea. Most of the remedies could be obtained in the woods, and it was not necessary to go to an apothecary. Indeed, there seemed to be as much dread of this compounder of drugs as of his godless colleague, the physician. For "perhaps he has not the drug prescribed by the physician and so puts in its place what will do as well. Perhaps he has it, but it is stale and perished; yet you would not have him throw it away. Indeed, he cannot afford to." So Wesley prescribes those remedies which are easily obtained, as is exemplified in the following treatments:

For Ague.—Go into a cold bath before the cold fit. Or, make six middling pills of cobwebs, take one a little before the cold fit; two a little before the next fit; the other three if need be a little before the third fit. This seldom fails. Or, eat a small lemon, rind and all.

To Cure Baldness.—Rub the part morning and evening with onions, till it is red, and rub it afterwards with honey.

The Colic.—Drink a pint of cold water. Tried. Or, drink a quart of warm water. Or apply outwardly a bag of hot oats. Parched peas eaten freely have had the most happy effects when all other means have failed.

The delightfully simple way in which consumption is disposed of would indicate that the many tuberculosis conferences held in recent years were useless, for the following simple remedies have cured "many deep consumptives."

One in a deep consumption was advised to drink nothing but water, and to eat nothing but water-gruel, without salt or sugar. In three months time he was perfectly well. *Or*, take a pint of skimmed milk, with half a pint of small beer. Boil in this whey about twenty ivy leaves, and two or three sprigs of hyssop. Drink over night half, the rest in the morning. Do this if needful for two months daily. This has cured in a desperate case. Tried.

Or, take a cow-heel from the tripe-house ready dressed, two quarts of new milk, two ounces of isinglass, a quarter of a pound of sugar candy, and a trace of ginger. Put all these in a pot, and set them in an oven after the bread is drawn. Let it continue there till the oven is near cold and let the patient live on this. I have known this to cure a deep consumption more than once.

Or, every morning cut up a little turf of fresh earth, and lying down, breath into the hole for a quarter of an hour. Tried. Mr. Masters, of Evesham, was so far gone that he could not stand alone. I advised him to lose six ounces of blood each day for a fortnight, if he lived so long, and then every other day, for the same time. In three months he was well.

Or, take for a quarter of an hour, morning and evening, the steam of white rosin and beeswax, boiling on a hot shovel. This has cured one who was in the third stage of consumption.

These read like the testimonials of some of the patent remedies, and it all goes to prove that people will recover even under the most "heroic" treatment. At the present time it would be considered homicide to prescribe blood letting in a desperate case of tuberculosis, yet we find Wesley vouching for a cure in a patient "far gone." Almost every disease has among the list of remedies cold baths, drinking water lying down or sitting up, or being "electrified." These, or at least all except the last, may not have been so unpleasant, but a large toasted cheese bound to a cut, or onions and honey in the ears, or the juice of rotten apples in the eyes were not so delightful. In cases of extreme madness we are advised to "set the patient under a great water fall, as long as his strength will bear it." Fortunately this treatment seems to have been abandoned, else it would be a most difficult matter to find suitable places for asylums. It certainly is unpleasant to think how nearly we lost Niagara as a pleasure resort, for undoubtedly the argument that the greater the fall the more speedy the cure would have resulted in lining the banks with sanitariums for the demented.

Before concluding the treatise Wesley makes a final plea for cold bathing which, besides curing every known and imaginable malady, "*prevents the growth of hereditary diseases*" such as blindness, deafness, and melancholy.

THE AMERICAN HOOKWORM (NECATOR AMERICANUS) IN GUAM AND CHINA.

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In 1902, I described the common hookworm of this country under the specific name *americanus*, because it was so distinct from the species reported for other parts of the world.

Since then, Looss has shown that earlier observers had specimens of this worm mixed in with their material of *Agchylostoma duodenale*, but that they had failed to recognize that they were dealing with more than one form. He has also found the American species in Africa, while Siccardi has reported the same worm for Italy. I have found the American form in soldiers who had returned from the Philippines, but as it was not excluded that the men had become infected in the United States, it seemed hazardous to conclude that *Necator americanus* should be considered a Philippine worm also. Recently, specimens of hookworms have been received at this laboratory taken by Dr. O. T. Logan, an enthusiastic collector, in Changteh, Hunan, China (U. S. P. H. & M. H. S., No. 9906); specimens (U. S. P. H. & M. H. S., No. 9915) have also been received from Assistant Surgeon O. J. Mink, U. S. Navy, collected from a native child in the Island of Guam. In both of these sendings, the worms seem to agree, both generically and specifically, with *Necator americanus*.

It will thus be seen that the American hookworm has a much more extensive geographic distribution than was at first assumed. This fact has no influence, however, upon the specific name *americanus*, for America still remains the type locality of the species from a nomenclatural point of view, although the interpretation that the species is originally of American origin is naturally weakened by the more recent findings.

SAHLI'S DESMOID REACTION IN GASTRIC DIAGNOSIS.

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(From the Clinical Laboratory of the Johns Hopkins Hospital and University.)

In 1905 Sahli (1) published a new method for testing gastric function without using the stomach tube.

This method is based on the assumption that catgut in the raw state is soluble in the peptic secretions of the stomach but entirely indigestible in the pancreatic juices. Ad. Schmidt (2).

To carry out the test one encloses a pill (of methylene blue 0.05 gram or iodoform 0.1 gram or both together with sufficient ext. glycyrrhizæ to make a pill not over 3 or 4 mm. diameter) in a rubber sack made by twisting the pill in the center of a square piece of thin rubber dam and tying the twisted neck with three turns of number 00 raw catgut previously soaked in cold water until soft, care being taken that the knots are both on the same side of the bag. The rubber is then trimmed away carefully so that only a little free edge of about 3 mm. remains beyond the ligature. It is essential to see that the cut edges of the rubber do not cohere, that the complete pill sinks instantly in water and is watertight.

This "desmoid pill" is given with or just after the midday meal, and the urine collected at periods of 5, 7, and 18-20 hours later is examined for methylene blue or iodine or both. The methylene blue is recognized by the greenish-blue color imparted to the urine or in absence of color, the urine is boiled with ⅓ volume of glacial acetic acid when a greenish-blue color appears if the chromogen of methylene blue is present. The chromogen alone is seldom found; most cases without color are due to the fact that the gut has not dissolved.

Iodine is recognized by strongly acidifying the urine with pure nitric or sulphuric acid and shaking out with a little chloroform, when the rose color is readily detected.

It may be tested also in the saliva with starch paper or acid.

If the methylene blue or iodine be found within the 18-20 hours after the ingestion of the pill the test is called positive, otherwise negative.

The advantages claimed for the test are that it is simple in application, that it causes the patient no distress, and more important yet, that, as it is given with the principal meal, it is subjected to the activities of the gastric functions when they are stimulated to do their utmost.

For, in accordance with Moritz' (3) observation, the pill being relatively heavy will remain in the stomach the maximum length of time and so test fully the activity of the gastric juice.

The desmoid will, therefore, often give a positive result when with the test breakfast we get an absence of free hydrochloric acid. This is, as Sahli pointed out, a matter of considerable diagnostic importance in distinguishing cases with

true achylia, carcinoma, or pernicious anæmia from less serious disorders in which the stimulus of the Ewald breakfast is insufficient to cause an excess of hydrochloric acid.

In the recent literature several extended reports have appeared which substantiate to a large extent Sahli's claims for his test. Notably those of Eichler (4), Kuhn (5), and Kaliski (6).

In this clinic, with the kind permission of Dr. Barker, I have examined some 34 cases in which there was impairment of the gastric function, in addition to 12 normal persons. These latter were all positive and are not included in the table. The pathological cases are arranged below in tabular form. In each instance, with two exceptions in which it was impossible to pass the stomach tube, the result of the test was compared with the findings of the Ewald breakfast or Fischer's meal or both.

As will be seen in the table of the carcinoma cases, all but one gave a negative test. This patient was an ignorant negro man who may have bitten the capsule or the tying may have been insecure. It was unfortunately impossible to repeat the test. At operation a large pyloric carcinoma was found involving also the lesser curvature.

With the same uniformity all of the seven cases of pernicious anæmia gave negative tests. Of these two had no gastric analysis, Case XXVIII being too ill and Case XXXII refusing to take the tube. It is interesting to note that this patient, while steadily improving as to blood count, gave constantly a negative desmoid test with persistent achlorhydria. In contrast, Case XXXIII with a secondary anæmia of long duration and of even lower grade (R. B. C. not over 1,500,000 in past three years) gave constantly a positive test.

Cases VIII and XXXIV, general carcinomatosis and carci-

Case Number.	Name.	Age.	Sex.	Race.	Diagnosis.	Free HCl.	Total acidity.	Lactic acid.	Desmoid reaction	Remarks.
I	C. T. T.	64	M.	Bl.	Carcinoma ventriculi.	0	36	0	Neg.	Fischer meal.
II	M. F.	59	F.	W.	" "	0	2.5	+	Neg.	
III	J. K.	43	M.	W.	" "	0	24	+ +	Neg.	
IV	G. W. E.	66	M.	W.	" "	0	4	0	Neg	
V	C. W.	48	M.	Bl.	" "	0	4	+	Pos.	
VI	M. M.	47	M.	W.	" "	0	51.	0	Neg.	Fischer meal.
VII	H. C. S.	57	M.	W.	" "	0	2	+	Neg.	
VIII	F. L.	54	M.	W.	General carcinomatosis.	0	5.	+	Neg.	
IX	L. O.	45	M.	W.	Chronic gastritis I. Carcinoma ventric (?) Lues secondaria.	0	38	0	Neg.	Marked alcoholism. Free HCl constantly O. Total acidity, 14-38.
X	M. J.	67	F.	W.	Cholelithiasis I. Carcinoma ventric (?)	6	30	0	Pos.	
XI	M. F.	56	F.	W.	Cholelithiasis I. Achlorhydria.	0	8	0	Neg.	Fischer meal. Desmoid positive after attack. Persistent achlorhydria with Ewald breakfast.
XII	W. M.	46	M.	W.	Chronic gastritis.	0	4	0	Pos.	Marked alcoholism, much mucus.
XIII	J. B. S.	37	M.	W.	Achylia gastrica (?) Tuberculous peritonitis.	0	5	0	Pos.	
XIV	A. H.	41	M.	W.	Chronic enteritis.	0	25	0	Pos.	
XV	J. A. N.	40	M.	Bl.	Gastric ulcer (?)	11	28	0	Pos.	Fischer meal. Doubtful case; strong possibility of cancer.
XVI	H. T. W.	23	M.	Bl.	Gastric ulcer.	22	43	0	Pos.	
XVII	A. E.	21	F.	Bl.	Gastralgia I. Gastric ulcer (?)	0	33	0		Pain. Varying acidity. Blood (?)
XVIII	H. M.	35	F.	W.	Gastric tetany.	0	8	0	Neg.	Persistent achlorhydria with Ewald test breakfast. Typical tetany attacks.
XIX	M. E. G.	34	F.	W.	Benign stricture of pylorus.	0	21	0	Pos.	Operation.
XX	C. L.	35	M.	W.	" " " "	0	21	0	Neg.	Pt. getting no food by mouth. Operation.
XXI	J. M.	48	M.	W.	Primary splenomegaly.	0	8	0	Pos.	Second desmoid Neg. day after severe hemorrhage pt. on low diet.
XXII	W. D.	52	M.	W.	Cirrhosis of liver.	0	8	0	Pos.	Possibility of early carcinoma.
XXIII	A. G.	37	M.	W.	Cirrhosis of liver. Psoriasis.	0	2	0	Pos.	Later tests showed Free HCl 7-21.
XXIV	W. H. F.	44	M.	W.	Myxœdema.	0	16	0	Pos.	Marked azotorrhœa.
XXV	S. vT. C.	36	M.	W	Neurasthenia I. Achlorhydria.	0	5	0	Neg.	Nervous dyspepsia 10 years. Desmoid positive with administration of HCl.
XXVI	F. I.	43	M.	W.	Pernicious anæmia.	0	10	0	Neg.	
XXVII	H. E. J.	47	F.	W.	" "	0	3	0	Neg.	
XXVIII	H. H.	30	M.	W.	" "	—	—	—	Neg.	No gastric contents obtained. Stomach negative at autopsy.
XXIX	L. B.	57	M.	W.	" "	0	0.2	0	Neg.	
XXX	G. L.	54	M.	W.	" "	0	9.	0	Neg.	
XXXI	C. B.	26	M.	W.	" "	0	1	0	Neg.	
XXXII	W. B. O.	31	M.	W.	" "	—	—	—	Neg.	No analysis possible. Desmoid still negative after 6 weeks.
XXXIII	F. E. C.	28	M.	W.	Hæmoglobinuria secondary anæmia; pulmonary tuberculosis.	15	40	0	Pos.	Long continued intermittent hæmoglobinuria. R.B.C. 824,000. Hb. 17%. Blood count not over 1,500,000 in 3 years.
XXXIV	F. K.	49	M.	W.	Carcinoma of pancreas.	0	20	0	Neg.	Marked azotorrhœa.

NOTE—Free HCl by Dimethylamidoazobenzol. Total acidity by phenolpthalein. Lactic acid by Uffelmann's test on the ether extract. Fischer's meal: Ewald breakfast plus ¼ lb. finely chopped lean beef lightly broiled and seasoned. Removed after three hours.

noma of pancreas, respectively, also gave negative tests, and absence of free hydrochloric acid.

Two cases of inoperable carcinoma of uterus with cachexia and low free hydrochloric acid gave positive tests. They are not included in the table.

Other interesting negative tests were obtained in Case IX, chronic alcoholic gastritis with secondary lues, who was strongly suspected of early carcinoma, but refused exploratory laparotomy. This case contrasted well with XII, who gave a positive test with his initial low acidity and improved under treatment until his free HCl was normal, while Case IX maintained a constant achlorhydria.

Case XI showed persistent achlorhydria with all test meals and gave a negative desmoid during the gallstone attack, with a positive test and increased total acidity in the interval.

Case XVIII, gastric tetany with persistent achlorhydria, gave a negative desmoid.

The negative result in Case XX is reasonably attributable to the fact that the patient was being fed per rectum only and there was thus no adequate stimulus to gastric secretion.

Case XXV, neurasthenia with achlorhydria, gave a negative test and later a positive desmoid while taking hydrochloric acid.

The positive outcome in the hepatic cases with low acidity is interesting. Cases XXI to XXIII.

A consideration of the above data seems to bear out Sahli's contention that the desmoid pill does show the ability of the stomach under the best conditions. Particularly is this true with regard to the presence of free HCl. In fact I feel inclined to agree with Eichler and Kuhn that its principal value is as a test for free HCl.

It cannot replace the test meal, but is a useful adjunct to this most essential measure.

Kaliski, I think, goes entirely too far in his deductions as to the nature and severity of the involvement, from the time of appearance and the intensity of the color.

Einhorn's (7) unfavorable opinion is open to legitimate criticism in that his observations were very limited and his glass bead test for the digestibility of gut in the intestinal juices is not proved accurate. Fat splitting ferments in the stomach and mechanical freeing of the gut must be taken into consideration.

I have exposed the well-soaked raw gut in solutions of the most active artificial pancreatic juice for periods of 15 days in the thermostat at 37° C. without the least damage to the gut. While a few hours in ordinary pepsin-HCl digesting fluid will dissolve it completely. Solution begun in pepsin-HCl mixture seems quickly checked in pancreatic fluid.

The pills found in the stools of the negative cases showed no evidence of digestion, yet in most cases the intestinal digestion of foods, including meats, was good. This fact speaks strongly for the specificity of the test for gastric digestion.

LITERATURE.

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4. Eichler: Berl. Klin. Woch., 1905, XLII, S. 1493.
5. Kuhn: Münch. Med. Woch., 1905, LII, S. 2412.
6. Kaliski: Deutsche Med. Woch., 1906, S. 185.
7. Einhorn: Journ. Am. Med. Assn., 1906, XLVI, p. 1434.

NOTES ON NEW BOOKS.

Counsels and Ideals from the Writings of William Osler. (*Boston and New York: Houghton, Mifflin & Company, 1905.*)

In this compilation, so judiciously made by Dr. Camac, one is struck by an aptness of quotation, a felicity of statement, a freshness of treatment, an elevation of thought, and a clearness of vision which are stimulating and illuminating. The extent and variety of the author's reading, his charity, his breadth of view, his high ideals, and the eminently human quality of his utterances all commend them to lovers of good literature, whether physicians or laymen. After once testing their exactness, the reader is impelled to go back to the original essays, to follow once more the author's guidance to rich fields of living thought. The extracts are happily chosen and the selection has been made by an appreciative friend.

Liverpool School of Tropical Medicine. Memoir XVI. Trypanosomes, Trypanosomiasis, and Sleeping Sickness: Pathology and Treatment. By H. WOLFERSTAN THOMAS and ANTON BREINL. (*London: Williams & Norgate, Publishers, 1905.*)

In connection with the studies of Dutton and Todd on Sleeping Sickness in the Congo Free State, Thomas and Breinl carried on the laboratory work at Liverpool, and have published a very exhaustive report of endless observations which were carried out on particularly rich animal material.

They first deal with the description of seven cases of sleeping sickness which were sent to England from the Congo Free State. Three of these were "sleeping sickness" and the other four "trypanosome fever." The periodicity of the presence of the parasites in the peripheral blood was very well shown in these cases, though the rises of temperature were not necessarily coincident with the increase of the number of parasites in the peripheral blood. This shows the difficulty in making a diagnosis by the examination of peripheral blood unless the examinations are made daily and for a long time. The second part of their report deals with inoculation experiments with *Trypanosoma Gambiense* upon baboons, monkeys, horses, donkeys, cows, sheep, goats, dogs, cats, rabbits, and guinea-pigs. They found that the *Trypanosoma Gambiense* was identical in animal reaction and morphology with trypanosomes found in the cerebro-spinal fluid in cases of sleeping sickness from Uganda and the Congo Free State as well as with the blood of trypanosome fever cases from the Congo Free State, and in Europeans affected in the Congo. They consider that there is no acquired immunity against infection, nor is there any transmission of the immunity to the offspring. In many experimental animals the infection is of a

very mild character, but the blood is still infective a year after the orignal inoculation. They further found that in the case of the horse the parasites are still seen, and the blood is still infective after a lapse of 28 months. They found no attenuation in the passing of a strain from a susceptible to a resisting animal, but that the parasites in an animal had apparently increased at times their virulency. In all their cases both in man and beast the periodicity of the parasite is a very prominent feature, and they found further that there was no change in the morphological characters of the trypanosome after being passed through many hundreds of animals during a period of three years. They further deal with different forms of trypanosome strains especially that in the Gambian horse disease, that of dourine and mal de caderas as well as surra. These authors did not find as good results from the use of gland puncture as did Dutton and Todd, nor were they frequently able to find the blood in the exudate of blisters. They followed Novy and McNeal in attempting to cultivate the trypanosomes, especially the Gambian form and the "*Trypanosoma dimorphon*" horse disease. They were able to keep the former alive for 68 days, but after the 17th day they found it no longer capable of infecting a susceptible animal; changing the media in many ways did not bring them any nearer success, although they speak hopefully of their belief in the ultimate success of this procedure. In the tubes they found that *Trypanosoma equinum* did seem to actually grow.

A very large number of experiments were made with regard to the treatment of trypanosome infection. They found that arsenic was the only drug which seemed to exert any action other than transient. The best results were obtained with the largest amounts of arsenic, and they consider that the treatment ought to be long continued, even after the apparent necessity therefor has disappeared. The so-called "trypanred" was of some use, and they think that the combination of arsenic and trypanred is even better; but the toxicity of arsenic is a drawback to its employment. The authors give very full accounts of post-mortem examinations, with the macroscopic and microscopic changes in four human cases as well as many animals.

Ibid. Gland Puncture in Trypanosomiasis. By the late J. E. DUTTON and J. L. TODD.

These authors found that puncture of the enlarged glands was by far the most satisfactory method of finding the trypanosomes. The gland is punctured with a needle, the material is diluted to prevent coagulation and centrifugalised, and they conclude that the examination of the fluid of the glands though not infallible is a very efficient method of detecting the parasite.

Liverpool School of Tropical Medicine. Memoir XVII. The Nature of Human Tick-Fever in the Western Part of the Congo Free State. By the late J. E. DUTTON and J. L. TODD. (*London: Williams & Norgate, Publishers, 1905.*)

Dutton and Todd cabled to Liverpool in November, 1904, that they had discovered that a spirochaete was the pathogenic agent of the human tick-fever, and that they had been able to infect monkeys through the bites of ticks. This was at the very time at which Ross and Milne published their notes on tick-fever in the British Medical Journal, so that the priority really belongs to the latter named, although Dutton and Todd made their discovery independently. About the time of this discovery both observers fell ill with recurrent fever and in February the lamented death of Dr. Dutton occurred. Todd has published the results of their joint work in the Congo. Shortly after entering the Free State they were able to collect ticks, and they had an autopsy upon a fatal case of tick-fever. From transmission experiments they were able to show that tick-fever is a relapsing fever produced by a spirochaete, probably identical with *Spirochaete Obermeieri*, and that this organism can be transmitted by the bite of the tick. Further, in one experiment they transmitted the spirillum by the bites of young ticks hatched in the laboratory from eggs laid by infected parents. They report on the history of human tick-fever in the Oriental Province of the Congo Free State, and add their clinical observations of a number of cases, including their own. Centrifugalisation of the blood is not very useful in demonstrating the organism and they succeeded best in using thick dehæmoglobinised blood films stained with weak carbol-fuchsin, or a modified Romanowski method. They give a considerable amount of information upon the distribution of the human tick in the Free State and conclude that tick-fever is clinically identical with a relapsing fever and is caused by a spirochaete, probably Obermeieri, and is transmitted from animal to animal by the tick (Ornithodorus). They consider that the transmission is not merely mechanical but that probably a developmental process is carried on in the tick and that a considerable degree of immunity can be acquired to the spirochaete.

Beobachtungen über Riesenzellen. Von DR. VICTOR BABES, University of Bucarest. (*Stuttgart: Verlag von Edwin Nägele, 1905.*)

In this monograph of 128 pages the author considers at length the formation of giant cells in various pathological processes, in particular in chronic productive inflammations, in the infectious granulomata, and in neoplasms, emphasizing the genesis of the cells rather than the finer details of structure. He gives the results of the study of an extensive material and his interpretation of the same with a generous consideration of the literature of the subject. In brief, it may be said that Babes concludes that giant cells may be formed from a great variety of cells; that they are formed not by fusion of cells, but by the process of nuclear division and by budding of cells—processes which are hindered by some injurious agent from their normal completion. In the inflammatory processes, he is unable to convince himself that the mononuclear leucocytes play a part in the formation of the giant cells, but derives them in great part if not entirely from vascular, endothelial, sprouts. A similar origin is attributed to the tubercle giant cell. The cells are not developed for the purpose of phagocytosis, but are somewhat abortive attempts at regeneration.

The article is accompanied by some excellent plates and by a good bibliography.

A Text-Book of Clinical Diagnosis by Laboratory Methods. By L. NAPOLEON BOSTON, A. M., M. D. (*Philadelphia: W. B. Saunders & Company, 1904.*)

This text-book covers the clinical examination of the blood, urine, gastric contents, feces, sputum, buccal secretion, nasal secretion, discharges from the ear and eye, secretion of the genital organs, transudates, exudates, cerebro-spinal and synovial fluids, diseases of the skin, and milk. It is illustrated with 320 illustrations, many of them in colors. The directions seem to suppose no previous knowledge of microscopy or chemistry, even the pictures of a glass slide and cover glass are given; the "simple spelling" of technical terms is used. The publishers have done their part fairly well. The illustrations are numerous enough, cover the ground fairly well, but many could be properly dispensed with. The same may be said of the text, for many directions are not complimentary to the intelligence of an ordinary medical student. A little learning is a dangerous thing, and this applies with especial force to the subjects with which this book deals. The student should not be allowed to begin the study of general biology and chemistry with the study of clinical microscopy and clinical chemistry, and if he tries to do so the simplest tests should be taught, not the hard ones. Again, the latter do not admit of "boiling down" for the expert, much less for the be-

ginner. The sufficiently prepared student does not need to be told "to grasp the test-tube between the thumb and index finger," the well trained one would certainly like to discuss certain steps in the methods, realizing that they could not be followed according to any fixed directions, of "one, two, three, etc.," and that even to slightly acidify some solutions isn't nearly as easy as it sounds.

The author has condensed methods to the danger point. He does not discuss the steps to render them intelligible. The clinical results are also condensed dry. The author uses the first personal pronoun singular with startling frequency.

Clinical Methods, A Guide to the Practical Study of Medicine. By ROBERT HUTCHISON, M. D., F. R. C. P., and HARRY RAINY, M. A., F. R. C. P. Ed., F. R. S. E. Third edition. (*Chicago, 1905.*)

This book has evidently been popular, since its first and second editions were each reprinted three times. It is not a treatise on medical diagnosis, but a compendium of methods which should be applied in the diagnosis of any given case; methods of physical diagnosis, of clinical microscopy and chemistry, of parasitology, of the diagnosis of nervous disorders, of the diseases of the spinal nerves, of diseases of children, and of clinical bacteriology. And yet the volume is pocket size, of 634 pages. It is quite profusely illustrated. Here we have a vast amount of information well "boiled down" to very small volume. Undoubtedly such books have a very great value, as digests of larger works and handy laboratory guides, but that the student could from these alone get a very valuable knowledge of a subject we very much doubt.

Medical Diagnosis. Special Diagnosis of Internal Medicine. A Handbook for Physicians and Students. By DR. WILHELM V. LEUBE. Authorized translation from the sixth German edition, edited, with annotations, by JULIUS L. SALINGER, M. D. (*D. Appleton & Company, 1904.*)

The translation of this book places at the disposal of those who do not read German readily one of the most important works on the diagnosis of medical diseases. This has long been the standard book in Germany, and an invaluable aid to many American students. Why it should not have been translated some time ago it is difficult to understand.

The translating has evidently been very carefully done, perhaps too carefully, for the long involved English sentences do not read nearly as easily as do the German, of which they are a literal translation. Sentences of eight or more clauses seldom read smoothly and some require study to gain their meaning. The publishers have done their work well. The use of italics for words and long sentences has been carried to an extreme. The figures and cuts are fair.

Indigestion. The Diagnosis and Treatment of the Functional Derangements of the Stomach with an Appendix on the Preparation of Food by Cooking, with Especial Reference to its Use in the Treatment of Affections of the Stomach. By GEORGE HERSCHELL, M. D., Lond. Third Edition, Entirely Rewritten. (*Chicago: W. T. Keener & Co., 90 Wabash Avenue. London: Henry J. Glaisher, 57 Wigmore Street, Cavendish Square, W., 1905.*)

When one recognizes the fact that a very large percentage of patients in private practice seek medical advice for some disorder of digestion, a practical book on this subject such as the present one is invaluable to the practitioner. This, the third edition of the work, is a material improvement on the last one. The subject matter is simply and clearly presented and a successful effort seems to have been made to avoid making a mystery of gastric disorders and gastric chemistry which too often has been the case in works treating on this subject.

The volume opens with a concise account of the normal processes of gastric and intestinal digestion. The causes, symptoms, chemistry, and treatment of the various forms of indigestion due to disturbances of the gastric secretion are then taken up. The author deals more especially with the various types of gastric neurasthenia.

Lack of knowledge of the proper way of cooking food in the domestic household of the present day is one of the most fruitful causes of indigestion. One of the great deficiencies in the teaching in our medical schools of to-day is the almost entire absence of instruction in dietetics and in the manner in which food should be properly cooked. When the student becomes a practitioner he is utterly incapable of instructing his patients as to how their food should be cooked or how some of the more simple articles of diet for the sick-room should be prepared. Consequently, a section by Herschell on the preparation of food with especial reference to its use in the treatment of affections of the stomach will be found most valuable to the practitioner.

Clinical Treatises on the Pathology and Therapy of Disorders of Metabolism and Nutrition. By CARL VON NOORDEN, Physician-in-Chief to the City Hospital, Frankfurt A. M. Authorized American Translation. Edited by BOARDMAN REED, M. D. Translated by FLORENCE BUCHANON, D. Sc. and I. WALKER HALL, M. D. Part VII. Diabetes Mellitus. Its Pathological Chemistry and Treatment. Lectures delivered in the University and Bellevue Hospital Medical College. New York Herter Lectureship Foundation. (*New York: E. B. Treat & Co., 1905.*)

As von Noorden's name has been so closely associated with, and he has so long been considered an authority on diabetes mellitus, the profession receives with keen interest any fresh contribution to the subject from this writer. The present series of lectures deals mainly with the disturbances of metabolism in diabetes, and with the therapeutics of the disease based on its pathological chemistry. The subject matter and its general arrangement bear a striking similarity to the author's treatment of the same part of the subject in his article in Volume II, of The Twentieth Century Practice of Medicine. It has been brought more up to date, however, by the inclusion of the results of recent researches by the author himself and by others. Although some of the views held by von Noorden have not received general acceptance, he has the faculty of presenting the most difficult and most important part of the disease—its pathological chemistry—in a manner in which the practitioner can obtain an intelligent grasp of it.

Only a few points can be touched on in this review. Von Noorden states that Cohnheim's recent theory, that the glucose of the blood is normally disposed of by the interaction of ferment-like bodies produced by the muscles and pancreas, is quite erroneous and that the disappearance of the glucose in his experiments was due to the effect of bacterial contamination. This was shown by the work of Embden and Claus carried out in the author's laboratory. Von Noorden has his own theory to account for the appearance of diabetes in certain lesions of the pancreas. He believes that the pancreas supplies to the blood a substance which has something to do either with the building up or with the breaking down of glycogen. This might be a ferment which favors the act of polymerisation in the formation of glycogen, or it might be an antiferment which prevents too rapid destruction of glycogen. In both cases poverty of glycogen in the organs and hyperglycæmia would be the inevitable consequence and the cardinal symptoms of diabetes would naturally follow. The author thinks that, as yet, it is not clearly established that the islands of Langerhans are essentially different from the rest of the pancreatic gland. It is claimed by some that they are only early stages of the ordinary secreting gland acini. He holds that

further evidence is necessary to prove that lesions of the glands of Langerhans and diabetes bear the relationship to each other of cause and effect.

Although for many years it was held that the acetone bodies were derived from proteid alone, the view at first cautiously advanced by Geelmuyden, Magnus, Levy, and Schwartz that they are really derived largely from fat is the one now generally accepted and the one supported by the author.

There is a very practical section on the therapeutics of diabetes. It will serve as a good guide to the practitioner in outlining the treatment in each individual case, rather than blindly following the same routine in all cases of the disease. The volume concludes with a series of food tables and tables of equivalents giving the percentages of proteid, fat, and carbohydrates in the more important articles of diet.

On Carbohydrate Metabolism, with an Appendix on the Assimilation of Carbohydrate into Proteid and Fat, Followed by the Fundamental Principles, and the Treatment of Diabetes Diabetically Discussed. By F. W. Pavy, M. D., L. L. D., F. R. S. (*London: J. & A. Churchill, 7 Great Marlborough Street, 1906. Philadelphia: P. Blakiston's Son & Co.*)

This volume of 138 pages gives Pavy's latest conception regarding the warehousing of carbohydrates in health and in diabetes. Although nearly all modern physiologists support the theory of the glycogenic function of the liver first advanced by Claude Bernard, Pavy for years has claimed that this theory is untenable. In this view he stands almost alone. As his work on diabetes and carbohydrate metabolism has been of so high a character and has always commanded the attention of the best physiologists and physiological chemists, we are forced to treat his opinions with the greatest respect. The fact that the recent work of Cohnheim, which at the time seemed to clearly solve the method in which the glucose of the system is disposed of, having been met with considerable opposition in certain quarters, together with the very diverse views advanced regarding the physiology of the carbohydrates, is ample evidence that the question is far from being a solved one. There is, therefore, all the more reason why Pavy's views, although differing markedly from those usually held, should be treated with consideration.

According to the glycogenic theory, the carbohydrates of the food are converted through processes of digestion chiefly into glucose, which passes by way of the portal vessels to the liver where it is converted by the liver cells into glycogen. The glycogen remains stored up in the liver until the system requires carbohydrates, when it is reconverted into glucose which is conveyed to the tissues by the general circulation.

Pavy, as stated, refutes the glycogenic theory as generally accepted. He believes that the lymphocytes play a most important part in the assimilation of the carbohydrates. He holds that the glucose, resulting from the alimentary digestion of carbohydrate food, enters into combination with the growing bioplasm of the lymphocytes of the intestinal villi, which contain lymphocytes in enormous numbers. These lymphocytes with their "locked up" glucose then reach the general circulation by way of the lacteals rather than by passing through the walls of the portal capillaries in the villi. Pavy thinks that if glucose reached the general circulation in a free form it would be filtered off by the kidneys at once, and that it is only by being "locked up" in the lymphocytes in the manner stated that this is prevented. After reaching the tissues incorporated in the lymphocytes the glucose is yielded off to them for combustion. The writer admits that when carbohydrates are taken in excess some of the glucose escapes the treatment above noted. This portion of the glucose passes by way of the portal capillaries to the liver where it is transformed into glycogen by the protoplasm of the liver cells and there stored up. This glycogen is later retransformed into glucose. Pavy holds that the glucose is not transported to the tissues for consumption in the free state; otherwise it would filter through the kidneys and produce glycosuria. He claims that the glucose is taken on as a side chain by a proteid constituent of the blood and transported in this combined form to the tissues, where it is broken up for subjection to utilization.

The writer's theory is an interesting one but is quite contrary to the general teaching at the present day. Whether his view be the correct one or not will be eventually shown by the subsequent work of other competent physiologists and physiological chemists. The sections on the assimilation of carbohydrates into fats and proteids and on the treatment of diabetes contain many points of practical interest.

Uric Acid. The Chemistry, Physiology, and Pathology of Uric Acid and the Physiologically Important Purin Bodies, with a Discussion of Metabolism in Gout. By Francis H. McCrudden. (*New York: Paul B. Hoeber, 69 East 59th Street.*)

In 1901 McCrudden began a study of the metabolism in certain bone diseases, rheumatoid arthritis, osteo-arthritis, osteitis deformans, etc., under the direction of Doctors Goldthwait, Painter, and Osgood, of Boston, who have added much to our knowledge of these diseases, especially of rheumatoid arthritis, preferably termed arthritis deformans, through their surgical treatment of these affections. It soon became apparent to the author that a thorough appreciation of our present knowledge concerning the chemistry of the purin bodies, uric acid and the so-called xanthin bases, and their relationship to the various joint affections, was indispensable. Accordingly, he reviewed and compiled the enormous mass of literature that has appeared up to August, 1905, on the chemistry of the purins and on the relationship of these bodies to gout. As this material has never been completely brought together and published in English for ready reference, McCrudden decided to issue the present monograph of 318 pages, giving his exhaustive analysis of the literature. The material is systematically arranged and data on any desired point is easily accessible. The volume is invaluable to anyone interested in the metabolism of gout and of allied joint affections.

The chemical investigations of the last few years have added much to our knowledge of the source and mode of formation of uric acid. Following the classification of Burian and Schur, we now speak of uric acid as being either exogenous or endogenous in origin. The exogenous uric acid is that derived from the ingested food, whilst the endogenous uric acid is an acid product of cellular metabolism in the body. So far as we are aware the uric acid in both instances is derived practically entirely from the nucleo-proteids, either of the food or of the body. Burian has recently shown, however, that a large proportion of the endogenous uric acid is derived from the hypoxanthin of the muscles which results from muscular activity. This hypoxanthin undoubtedly is in part derived from the nuclei of the muscle cells. A feature that must be emphasized is that uric acid is derived almost alone from the nucleo-proteids and not from the simple proteids such as egg albumen.

It is only within the last three years that we have learned that specific ferments play a most important part in the transformation of the nucleic acid, which is split off from the nucleoproteids, into uric acid. This knowledge has been acquired chiefly through the investigations of Burian, Walter Jones, and Schittenhelm. The following quotation from McCrudden gives concisely our present knowledge on this point. "The action of spleen, liver, and other organs in the transformation of purin bases to uric acid has been much studied recently. It will be remembered that in the study of the occurrence of purin bases in the tissues, we saw that different purin bases were obtained in fresh organs from

those obtained in organs which had undergone self-digestion. The results of Levene, who studied this subject, show that the amino purins change to the oxypurins in the process of autolysis. According to Jones, there is an enzyme in thymus which can decompose the nucleoproteid and give the free amino purins, and another enzyme which changes the animo purins to the oxypurins. In the pancreas there is an enzyme which changes the guanin to xanthin. In the spleen there is an enzyme which changes adenin to hypoxanthin. According to Jones, "guanase," the ferment which changes guanin in xanthin, is a different body from "adenase," which changes adenin to hypoxanthin, for in the liver the adenin changes to hypoxanthin, but the guanin does not change to xanthin. Schenck agrees with Jones that the guanase and adenase are different ferments, but he differed from Jones in finding an adenase but not guanase in pancreas. The view of Schittenhelm seems more probable. According to this author, there is one ferment which splits the purin bases from nucleic acid; another which changes the animo purins to the oxypurins, and a third which oxidizes hypoxanthin and xanthin to uric acid. These ferments are widely distributed in the various organs, liver spleen, lungs, and muscle. Schittenhelm isolated both the oxidase and the ferment which splits off the amino group to some extent. These ferments do not act on the nucleic acid. This author believes that the ferment which changes the amino purins to the oxypurins is the "desamidierende" enzyme which Lang has found widely distributed in the organism. Burian likewise has found in organs anenzyme which oxidizes oxypurins to uric acid.

As to the four theories advanced to explain the increased uric acid in the blood in gout—increased formation, retention, decreased destruction, and change in chemical composition—McCrudden fails to express any definite opinion as to which he thinks the most plausible one. He emphasizes an important fact, namely, that physical chemistry has taught us that the acidity and the alkalinity of many complex mixtures of electrolytes such as blood and urine cannot be determined by titration methods. Only recently has an accurate method been offered by which the acidity of the urine and the alkalinity of the blood can be determined. By means of this method Höber has shown that the prevailing views concerning the acidity of the urine and the alkalinity of the blood are far from correct. The work of His and Höber puts an end to many theories concerning uric acid in the blood and urine and to any scientific basis for the alkali therapeutics in gout. McCrudden points out that the work of Burian and Schur, Soetbeer, Ibrahim, and Salkowski shows that uric acid is excreted in great part unchanged by man. He states that this is a final death blow to the old view that uric acid is an antecedent of urea in the destructive metabolism of proteid.

Gall-Stones and Their Surgical Treatment. By B. G. A. MOYNIHAN, M. S. (Lond.), F. R. C. S. Leeds. Fully illustrated with colored and black and white drawings (*Philadelphia: W. B. Saunders & Co., 1905.*)

The appearance of this book by such a well-known author as Moynihan is warmly welcomed. The subject is systematically treated in eleven chapters and the book is well indexed. It is well printed on good thick paper and contains numerous illustrations in color and in black and white.

The first fifty-seven pages are devoted to the anatomy of the gall-bladder and gall-ducts and to a study of the constitution and origin of gall-stones. About fifty pages are devoted to the pathology of gall-stone disease, a hundred to the symptoms and physical signs, and about fifty more to the complications and sequelæ. The remainder of the book is devoted to a description of operative procedures.

Moynihan states that the valves of Heister are not arranged spirally; that in two-thirds of the cases the pancreatic portion of the common duct can only be reached by dividing pancreatic tissue; and he calls attention to the importance of Opie's work in explaining acute pancreatitis.

According to Moynihan the earliest symptom in almost all cases of gall-stone disease is "indigestion." He notes also that jaundice is a rare symptom. He credits Courvoisier with the discovery that, in persistent jaundice due to stones, the gall-bladder is contracted in over eighty per cent of the cases and that persistent jaundice with distention of the gall-bladder, in over nine-tenths of the cases, was caused by a pressure from without the duct, chiefly from carcinoma of the head of the pancreas. He points out that in the case of stone in the common duct there is an ebb and flow in the jaundice, while in cancer the jaundice steadily increases and has more of a greenish hue.

Moynihan considers that chronic pancreatitis is the condition most difficult to differentiate from stone in the common duct. He states that after the stone is passed "the thickening of the head of the pancreas which has been left behind may cause a remarkable mimicry of the symptoms of stone."

In the chapters on operative procedures he gives full directions for the preparation necessary in the case of the surgeon, assistants, patient, etc. He states that only one assistant is necessary or desirable.

For suture material he uses catgut, prepared according to the method of Claudius, and Hagenstecher's celluloid thread. He gives a careful and detailed description of his method of performing the various operations upon the bile passages and describes many illustrative cases.

O. B. P.

Food and Diet in Health and Disease. By ROBERT F. WILLIAMS, M. A., M. D., Professor of the practice of medicine in the Medical College of Virginia. (*Philadelphia and New York: Lea Brothers & Co., 1906.*)

This little book seems well fitted for its purpose. It contains little or nothing that is new, but as the author states in the preface that he has drawn largely upon literature in its preparation, originality is not to be expected. The most distinctive thing about it is that the author deviates from the time-honored usage which divides foods into animal and vegetable and considers them according to their predominating essential constituents from an alimentary point of view, an arrangement which is certainly more rational.

The choice of material is good and the arrangement is well-suited to the end in view; moreover, the style is interesting and readable, a matter of no small importance in a book of this kind, for in all works upon food the question must arise whether the systematic consideration of food from the point of its nourishing qualities does not destroy our appetite for it. To fix our attention upon what we eat solely, or even mainly, with the idea of benefit to be derived from it must in the end induce a detached state of mind similar to that of the man described by Mr. William Dean Howells "who took his meals in a detached manner as if he were feeding an engine." Such a mental attitude must, we should think, be destructive to all enjoyment, and yet enjoyment physiologists tell us, is a potent factor in digestion and assimilation. The only way out of the difficulty would seem to be that systematic treatises should be read by the few who may then make use of the knowledge thus acquired in the interests of the many.

A Text-Book of Diseases of Women. By BARTON COOKE HIRST, M. D., Professor of Obstetrics in the University of Pennsylvania. With 655 illustrations, many of them in colors. (*Philadelphia and London: W. B. Saunders & Co., 1903.*)

This work seems well adapted for the purpose of a text-book, for it is written in a clear condensed style, which assumes that

the acquisition of information, not the discussion of theories, is the reader's object in reading it. The range of subjects is, of course, the same as that contained in all books of the kind and there seems to be little that is original or even distinctive. The author has, we think, done wisely in laying stress on the palliative or restorative side of gynecology, which has received too little attention from gynecological specialists since its surgical aspect came into prominence.

The illustrations are not, perhaps, of the highest order of merit from an artistic point of view, but they are sufficiently good for their purpose, and it is better that they should fall short of the utmost perfection than that the price of the book should be raised to an unreasonable amount in order that they should be carried to the greatest degree of artistic excellence.

One minor matter, we think, deserves a word of comment. It is to be regretted that a man of reputation should lend the sanction of example to the present practice of writing compound words in one. Such words as fibromyomata, bulbocavernosus, pseudohæmaphroditism, etc., in our opinion demand a hyphen between their two component parts, first, because it serves a useful purpose in showing that the word has two sources, and, second, because the length of most compound words makes them a weariness to the eye and the mind in reading. We have reason to congratulate ourselves that our native language is free from the clumsiness which such words induce in the German tongue. Why then should we voluntarily introduce the defect?

Diseases of the Nervous System. A text-book for students and practitioners of medicine. By H. Oppenheim, M. D., Professor at the University of Berlin. Translated and edited by Edward A. Meyer, M. D., Pittsburg, Pa. Second American edition, revised and enlarged, with 343 illustrations. (*Philadelphia: J. B. Lippincott & Co., 1904.*)

The author of this book has wisely devoted his energies and his well-known acquaintance with the subject to the production of a work adapted exclusively to the needs of students and general practitioners, and has made no effort to render it suitable for specialists in the study of the nervous system. In this decision he has, we think, shown excellent judgment, since an attempt to fulfill both purposes would certainly have failed of success with either. The clinical side of his subject is gone into with the utmost thoroughness and the discussion of its therapeutics is as satisfactory as it is possible that it should be in the present condition of our knowledge concerning it. References to literature have been intentionally avoided as tending to impair the continuity of the text, but it is quite plain that the writer's knowledge with all that has been written on the subject has been thoroughly assimilated and the best of it brought forward in the manner most profitable to the reader. The translator has done his work well, on the whole, although words occasionally occur which do not, to our thinking, render the best equivalent for the original.

Medical and Surgical Reports of the Boston City Hospital. Fifteenth Series. Edited by H. L. Burrell, M. D., W. T. Councilman, M. D., and C. F. Withington, M. D. (*Boston: Published by the Trustees, 1905.*)

The report of the Boston City Hospital for the year 1905 contains some very interesting reading. Sixty cases of extra-uterine pregnancy, reported by P. S. Newell, occurring in five and a half years, seems a much larger number for one hospital than our present knowledge of the condition would have led us to suppose possible. One of the points connected with the condition upon which our minds are now receiving enlightenment, however, is that it is of greater frequency than we have hitherto supposed and the length of this particular record is valuable confirmatory evidence to this effect. A careful study of these cases also brings out sundry other points in which, it would appear, we have been under a misapprehension. For example, it has been asserted without contradiction that most cases of ectopic gestation give a history of sterility for a number of years before its occurrence, and the inference has, therefore, been that the majority of cases occurred in elderly primaparæ or in multiparæ who had become pregnant after a period of sterility. The series in question shows, on the contrary, that only nine patients were pregnant for the first time and the ages of these varied from twenty to thirty-six; of the remaining fifty-one cases, all but one had been pregnant at a recent date and their ages varied from twenty to forty-two. It would seem, therefore, that ectopic gestation is most frequent in the middle child-bearing period of life and in women who have recently been pregnant. Or rather, as the writer puts it, "the condition may arise in any woman exposed to pregnancy at any time."

A fully reported case of Pott's disease in the monkey, by E. E. Southard, is of considerable interest to comparative pathology. So far as it goes it tends to show that the morbid processes of our poor relation differ but little from our own.

A case of oxyuris vermicularis in the vermiform appendix, reported by S. T. Otron, is one more added to the number, which is still very small. Kelly and Hurdon, as the writer states, report only seven instances of the condition collected from literature.

Five cases of glanders, by Abner Post, are a contribution to a subject which is little discussed. One of these cases occurred in the Boston City Hospital during 1905, and the others were collected from the records since 1864, the date when it first received inmates. They are all given at length for purposes of comparison, and although they are, of course, too few for any definite conclusions to be drawn from them, they indicate, so far as they go, that an initial pneumonic process is more frequent than has been usually supposed.

These are but a few of the interesting articles contained in this report, indeed there is hardly one which does not contain something that specially recommends it, either from the point of view of rarity or from that of careful consideration and tabulation. The editors may be congratulated on having issued a report of unusual interest and originality.

Walter Reed and Yellow Fever. By Howard A. Kelly, M. D., Professor of Gynecological Surgery, The Johns Hopkins University. (*New York: McClure, Phillips & Co., 1906.*)

No more stimulating and interesting book of medical biography has appeared since Radot's Life of Pasteur, which it resembles in many respects and its lesson for the medical profession is of equal importance. It is the story of the life and achievements of one who unquestionably has made the most important medical discovery of any American, a discovery which as far as the saving of human life is concerned must be placed beside that of Jenner, a hundred years ago. The tale of Walter Reed's life may be told in a few words: Of English stock originally, the son of a Methodist clergyman, born in Gloucester County, Virginia, in 1851, he received his education principally at the University of Virginia, graduating in medicine in his eighteenth year. He pursued his medical studies subsequently in New York and received a degree also from Bellevue Hospital Medical College. He served thereafter in several hospitals in New York, and recently and finally became a sanitary inspector in Brooklyn. In 1874 he was appointed an assistant surgeon in the U. S. Army, and during the following sixteen years saw service in Arizona, Nebraska, Alabama, and Washington, D. C. In 1890 he came to Baltimore and began the study of bacteriology and pathology under Prof. Welch at the laboratory then just opened by the Johns Hopkins Hospital, prior to the organization of the Johns Hopkins Medical School. In 1893 he became curator of the U. S. Army Medical Museum and professor of pathology and clinical microscopy in the U. S. Army Medical School founded by the zeal and scientific

initiative of Surgeon-General Sternberg. Here he did excellent work as a teacher and investigator and laid the foundation of a scientific reputation which, during the Spanish-American War, led to his appointment as a member of a Commission to investigate the epidemic occurrence of typhoid fever among the troops in their camps. In 1899 he with Dr. Carroll demonstrated the incorrectness of Sanarelli's claim that he had discovered the causative agent of yellow fever. In 1900 he was sent to Havana at the head of a commission to investigate the etiology of yellow fever and by a series of brilliant and conclusive experiments demonstrated that yellow fever was transmitted from man to man by the bite of a variety of mosquito, the Stegomyia fasciati. In November, 1902, he died of appendicitis while engaged in his duties at the Army Medical Museum, after a brief illness.

The story of his life has been told simply and attractively by the author of this book, which deserves to be widely read. The letters which Reed wrote while an army surgeon are graphic and full of incident. The chapters which treat of yellow fever in America and the rise and fall of the numerous theories as to its causation are valuable contributions to the literature of the disease. The account of the development of the theory of the causative relation of the mosquito to the spread of the dread disease is well told and the book as a whole is worthy to take its place among the standard biographies of eminent medical men. It is a matter of genuine surprise to those who are familiar with the varied activities of the accomplished author in many fields, that he should have found time to pen this graceful, painstaking and affectionate tribute to the work and worth of Walter Reed.

BOOKS RECEIVED.

Differential Diagnosis and Treatment of Disease. By Augustus Caillé, M. D. With two hundred and twenty-eight illustrations in the text. 1906. 8vo. 867 pages. D. Appleton & Company, New York and London.

A Manual of Materia Medica and Pharmacology. Comprising all Organic and Inorganic Drugs which are or have been Official in the United States Pharmacopœia. By David M. R. Culbreth, Ph. G., M. D. Fourth edition, enlarged and thoroughly revised. With four hundred and eighty-seven illustrations. 1906. 8vo. 976 pages. Lea Brothers & Company, Philadelphia and New York.

A Laboratory Manual of Physiological Chemistry. By Elbert W. Rockwood, M. D., Ph. D. Second edition, revised and enlarged. With one colored plate and three plates of microscopic preparations. 1906. 12mo. 229 pages. F. A. Davis Company, Philadelphia.

Refraction Including Muscle Imbalance and the Adjustment of Glasses. By Royal S. Copeland, A. M., M. D., and Adolph E. Ibershoff, M. D. 1906. 8vo. 144 pages. Boericke & Tafel, Philadelphia.

The Diseases of Infancy and Childhood. Designed for the Use of Students and Practitioners of Medicine. By Henry Koplik, M. D. Second edition, thoroughly revised and enlarged. Illustrated with 184 engravings and 33 plates in color and monochrome. 1906. 8vo. 885 pages. Lea Brothers & Company, New York and Philadelphia.

Lectures on Tropical Diseases. Being the Lane Lectures for 1905. Delivered at Cooper Medical College, San Francisco, U. S. A. August, 1905. By Sir Patrick Manson. 1905. 8vo. 230 pages. W. T. Keener & Company, Chicago.

A Text-Book of Diseases of the Nose and Throat. By D. Braden Kyle, M. D. With 175 illustrations, 24 of them in colors. Third edition, revised and enlarged. 1904. 8vo. 669 pages. W. B. Saunders & Company, Philadelphia, New York, London.

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